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# STEEL

*The Magazine of Metalworking and Metalproducing*

VOL. 118. NO. 10 MARCH 11, 1946

## NEWS



## TECHNICAL



## FEATURES



## MARKETS



## NEXT WEEK...

Jobs for High-Intensity Induction Heating

Silver Alloy Brazing of Copper Piping

Casting Molds for Small Billets

Electronically-Controlled Template Grinder

Aluminum Alloy Forging-Stamping in Britain

# As the EDITOR VIEWS the NEWS

## Who Lost the Pattern?

Last Monday a group of fabricators called upon President Truman to explain the plight of companies caught in the wage-price squeeze. They had with them handbills distributed by pickets which implied that the 18½ cent per hour increase sought by strikers had been endorsed by the President. They also called the President's attention to the letter written by Chester Bowles to Philip Murray assuring the latter that wage increases up to 18½ cents would be approved automatically under the new wage-price policy.

Confronted with this evidence, Mr. Truman stated emphatically that his recommendation of an 18½ cent increase applied solely to primary steel producers. He said he assumed fabricators would negotiate settlements independently. He reiterated his support of small business and said he hoped employees in the 700 strike-bound plants could return to work soon.

This statement came as a surprise to everybody. The strike vote was conducted on an industry-wide basis with government sanction. The intent of CIO was to treat all companies as units in a common herd and official Washington, including the President, not only assented to this unfair procedure but actively encouraged it. Then, after government meddling had prolonged the strike, the President and his associates proudly announced a new wage-price policy. They credited it with having settled the strikes in steel producing plants and they certainly counted upon it as being the pattern that would settle the strikes in fabricators' plants. The nation at large, while not agreeing with the program, accepted it under protest as the best the administration could devise at the moment.

Now the President says the policy applies only to steel producers! This means either that the government has no pattern for fabricators or that if Bowles, Wallace or whoever is running the show really has a pattern, the President of the United States does not know about it.

Worse yet, after having thoughtlessly set a precedent of 18½ cents—making it virtually impossible for a small manufacturer to settle for less—the President, with an innocence that defies understanding, blandly counsels fabricators to go home like good little boys and negotiate a settlement.

This reminds one of the lad who in the brash confidence of youth undertakes to repair his mother's kitchen clock. After tinkering with it for an hour, breaking the mainspring and losing a few vital parts, he carries the wreck to mother with the chastened plea, "Ma! Maybe you better fix it."

STEEL
March 11, 1946

**HERE IS REAL PROGRESS:** Some day when the superheated atmosphere of present-day labor relations has given way to calm retrospection, thoughtful individuals in the ranks of management and labor may refer to the contract negotiated by Ford Motor and UAW as a significant turning point in collective bargaining.

There are several good reasons why this contract is noteworthy. The most important is that the Ford-UAW compact was negotiated without curse of government intervention. Secondly, it was negotiated by able representatives of management and of labor. Ford's agents were understanding of labor's problem. The union's representatives avoided the Reuther technique which has been a definite handicap in the General Motors situation.

As a result of constructive statesmanship on both sides, coupled with the absence of government kibitzers, Ford and UAW have reached an agreement which goes far beyond the terms of most settlements. While it does not provide for financial penalties for inciters of unwarranted work stoppages, it does recog-

(OVER)

nize these breaches of discipline as a black-eye for labor leadership and it provides for punishment, subject to checks for fair dealing.

Industrialists seeking light on the confused problem of labor relations may well study the 65 mimeographed pages of the Ford contract. It is far from perfect, but it is pointed in the right direction.

—p. 75

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**NOT DISCRIMINATION:** Remember back in the first grade when the new boy in town, dressed in spotless clothes, came to school and handed the teacher a bright red apple? Remember also that the male members of the class displayed an immediate and positive dislike of the new boy. Later, when they got to know him better, he became their friend.

Because something like that is happening in the relations of Henry Kaiser and Joseph Frazer with veteran steel producers, Messrs. Kaiser and Frazer seem to be mistaking the initial coolness that stems naturally from their exceedingly enterprising job of apple polishing for downright discrimination. Few persons who know the steel industry are going to believe this charge. If there were plenty of steel available today, every steel producer would have his ace salesman on the Kaiser-Frazer doorstep with hat in hand—regardless of whether or not the boss likes these two aggressive gentlemen.

Steel is scarce. Many sellers cannot give firm commitments to anybody—even to customers of long standing.

—p. 65

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**INFRA-RED TIME SAVERS:** Use of infra-red radiation in baking the finishes on automobiles, trucks and numerous other manufactured products is one of several relatively simple developments which have found ready acceptance in mass production industries during the last decade.

In early installations, the radiant heat generated by infra-red lamps was directed by ordinary automobile lamp reflectors. Soon infra-red equipment manufacturers were seeking reflectors with a higher efficiency. Research and experience led them to two superior reflector surfaces. They are gold and specular anodized aluminum. Gold is rated at about 98 per cent reflectance efficiency. In practice, a steel reflector is plated with copper, nickel is plated over the copper and finally gold is plated over the nickel.

Improved reflectors, plus other developments in infra-red ovens, now enable automotive assembly lines to dry prime and finish paint coats in a fraction of the time previously required.

—p. 95

**SIGNS OF THE TIMES:** Maj. Alexander deSeversky, returning from the Pacific war area as a special consultant to Secretary of War Patterson, reports that the claims of direct damage inflicted upon Hiroshima and Nagasaki by atomic bombs are exaggerated (p. 73) and that had these cities been of steel and concrete construction comparable to New York or Chicago, the damage would have been no greater than that of a 10-ton "blockbuster." Testimony of some atomic bomb experts contradicts Major deSeversky's conclusions. . . . Office of International Trade has compiled a list (p. 72) of 67 foreign purchasing missions maintained in the United States. . . . A Senate subcommittee on surplus property disposal expects that proposed government restrictions on industrial construction (p. 89) will greatly increase the demand for government-owned surplus plants and enhance speedy disposal. . . . International Harvester Co. joins the imposing group of industrial corporations which are sharply expanding their research activities. The Harvester company will establish eight laboratories in a new research center (p. 79) in buildings on South Western Ave., Chicago, in which aviation parts were manufactured during the war. . . . Up to the time of the recent steel strike, steel rails were quoted and sold on a gross ton basis. OPA granted an increase of $5 per net ton (pp. 59, 60) and it now appears that the influence of this incident may be strong enough to permanently shift the marketing of rails to a net ton basis. . . . E. C. Barringer, president and executive secretary of the Institute of Scrap Iron & Steel, after touring Europe with a party of scrap experts on behalf of the War Department's Overseas Scrap Advisory Committee declares (p. 68) that "if all the ferrous scrap available to us in Europe were brought to the United States, it probably would not equal a month's requirements of purchased scrap with the steel industry operating at peak ingot production". . . . Attorney General Tom C. Clark reports that wartime contractors (p. 69) voluntarily have refunded more than $6 billion in excess profits since 1942. . . . Shelter Industries, Inc. is a newcomer in the factory fabricated house field. This company's houses (p. 78) are designed to include central utility heating and plumbing units manufactured by Ingersoll Steel Division of Borg-Warner Corp. . . . Soviet Russia is developing a new metallurgical and industrial center at Azerbaidzhan, near Baku. The project (p. 80) includes seven open-hearths, blooming mill, tube mills and machine shops.

E. L. Shaner

EDITOR-IN-CHIEF

# STEEL IS SHORT

# but Ryerson Service Carries On!

Settlement of the steel strike last month was heartening to us all, but unfortunately it did not mean the immediate end of the steel shortage.

When peace came and the large ordnance uses for steel were no more, many thought there would be plenty of steel for every purpose. However, American industry converted so quickly to the manufacture of peacetime products that the pent-up need for steel became as great or perhaps even greater than war-time demand. Particularly was this true of the lighter flat rolled products.

Then, at the height of this unprecedented demand most all steel production was discontinued. As a result, no steel was received to replenish warehouse stocks while the strike was in progress. Ryerson lost tonnage fast. And, while there is still a good total tonnage on hand, we now have no inventory at all in many sizes of every product.

When steel mill facilities are closed down and the furnaces cool, much repairing is often necessary before operations can be resumed. So considerable time must elapse before mills can again run at capacity. We have large orders on the mill books and steel is already being received, but it will be some time before our stocks are again complete.

In the meantime, you may be very sure that our whole organization will do everything within its power to help every customer secure the steel necessary to his operations. Whatever you may need, or whatever your steel problem, we urge you to keep in touch with us.

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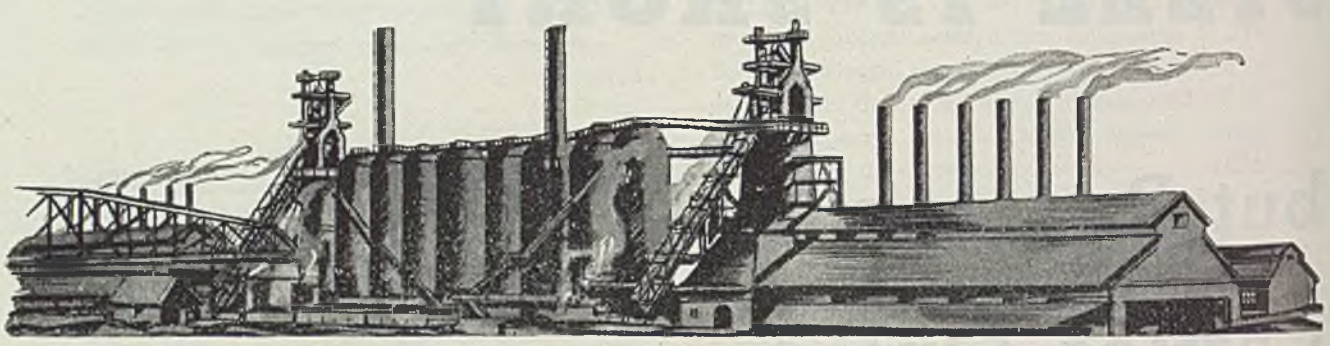


# Supplying Steel

## Is Only Part of Our Service

Cooperating to get the ultimate in ductility, hardness or a special balance of these properties for a specific purpose; or aiding in the solution of a perplexing problem of fabrication which might otherwise prove costly, is also part of Inland service.

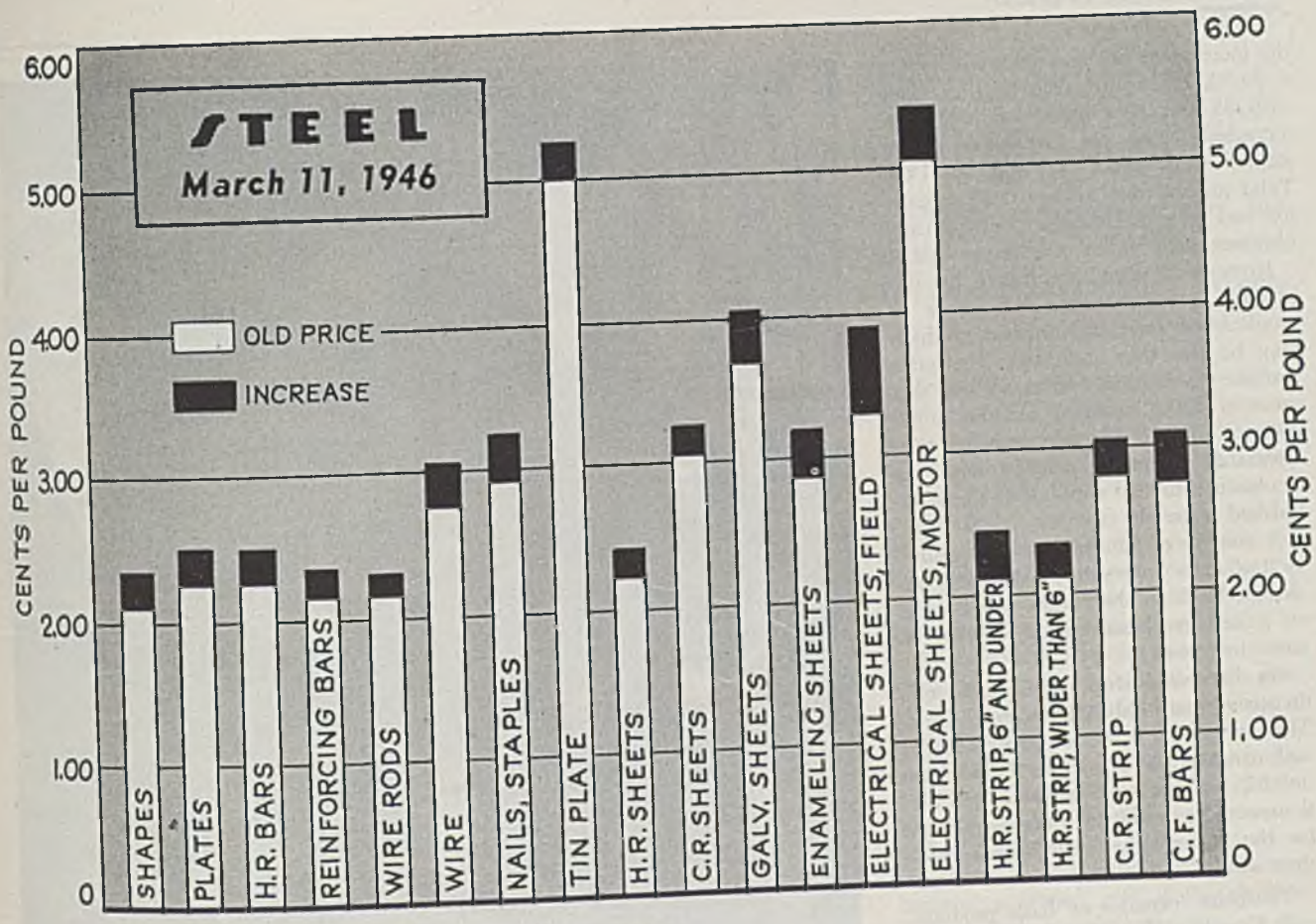
From broad contacts with users in many fields our engineers and metallurgists can often furnish or suggest the answers to puzzling situations. Or our research laboratories, while constantly seeking new and better steels, may have already developed the exact type of sheet, plate or other steel product that will meet your requirements.

No matter how difficult or exacting the specifications, you can always depend on the closest cooperation and teamwork from Inland. Our staff of specialists backed by modern plants operating under rigid standards and efficient scheduling, assure processors, fabricators and users the greatest dependability from steel.

*Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill., Sales Offices: Cincinnati, Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Paul, St. Louis.*

PRINCIPAL PRODUCTS: BARS • STRUCTURALS • PLATES • SHEETS • STRIP • TIN PLATE • FLOOR PLATE • PILING • REINFORCING BARS • RAILS • TRACK ACCESSORIES.

# INLAND STEEL COMPANY




# Steel Price Increases Range from $2 to $12 a Ton; Average 8.2%

*Distribution of increase gives apparent relief to small mills by widening spread between semifinished and finished products. Warehouses permitted to pass through higher prices on dollar-and-cent basis*

INCREASES averaging $5 a ton, or 8.2 per cent in the realized price of all steel, were placed in effect last week by basic steel producers, after the Office of Price Administration had announced the distribution of the increase among the various products. The increase is effective as of Feb. 15 and producers will send supplementary billings to buyers on shipments made between Feb. 15 and establishment of the new price schedules.

The increase raises the realized price of all steel, both carbon and alloy, to $65.92, compared with the old price of $60.92, according to OPA computations.

For most carbon steel products the increase was made on a straight dollars and cents basis, from $2 a ton on ingots and sheet bars to $12 a ton on some grades of electrical sheets. On alloy, tool and specialty steels and certain specialty products, a percentage increase was made.

Steel warehouses will be permitted to pass through to their customers the amount of the increases, generally on a dollars and cents basis rather than a percentage, as from March 1, the date the distribution was announced by OPA. An exception exists in the case of the additional extra granted producers for selected rimmed stock (specially prepared steels for deep-drawing). The pass-through of this extra will be permitted in the immediate future.

Additional pricing actions will be taken soon for fabricated products such as steel drums, bolts, nuts, screws, rivets and similar products. These additional adjustments will provide industry-wide adjustments in ceiling prices if required to relieve financial hardship occasioned by increased costs of the raw steel they use, and also any wage increases which are approved by the Wage Stabilization Board.

The degree of absorption of the higher steel costs that will be required of producers and distributors of consumer goods, machinery and building materials is being worked out by OPA and will be announced later.

On the basis of an estimated 1946 production of 51 million tons of finished steel, the increase will add about $255 million to steel producers' revenues. This will cover the cost of the 18½-cent hourly wage increase recently granted to steelworkers but will leave little to compensate producers for wage and other cost increases absorbed during the war.

On paper, the distribution of the increase appears to offer some relief to the small nonintegrated companies which buy semifinished steel for rolling into finished products. The increase on sheet bars, for example, is only $2 a ton, while

the increase on hot and cold-rolled sheet is $4.50, cold-rolled strip $5, hot-rolled strip $5 and $7 a ton. Wire rods were increased $3 a ton, while nails and staples were raised $7 and wire $6. Tube rounds were advanced $3 a gross ton and pipe and tubular goods $5 and $6 a net ton.

However, the relief offered by this broader spread between the prices on semifinished steel and finished products may be less than indicated. The price increase on semifinished is so low that there is little incentive for the larger mills to offer it for sale and the non-integrated companies may be hard put to obtain sufficient supplies of the semi-finished material.

A number of adjustments are required by the mills as result of the OPA increases. Rails in the future will be sold on a net ton basis instead of the old gross ton basis.

On hot-rolled strip, OPA made two divisions where only one existed before. The increase on hot-rolled strip, 6 inches and narrower, is $7, while the increase on strip wider than 6 inches is $5. This is expected to result in a higher demand for the wider strip, with buyers doing their own slitting.

The price increases on basic products, with the old and new prices, follow:

| Product | Old Price | Increase | New Price |
|---|---|---|---|
| (Pittsburgh base, per gross ton) | | | |
| Ingots | $31 | $2 | $33 |
| Sheet Bars | 36 | 2 | 38 |
| Blooms | 36 | 3 | 39 |
| Billets | 36 | 3 | 39 |
| Slabs | 36 | 3 | 39 |
| Forging Billets, Blooms | 42 | 5 | 47 |
| (Per net ton) | | | |
| Rails, Standard | $38.39 | $5 | $43.39 |
| Rails, Light | 40.18 | 9 | 49.18 |
| (Cents per pound) | | | |
| Skelp | 1.90 | .15 | 2.05 |
| Shapes | 2.10 | .25 | 2.35 |
| Piling | 2.40 | .25 | 2.65 |
| Plates | 2.25 | .25 | 2.50 |
| Tie Plates | 2.30 | .25 | 2.55 |
| H. R. Bars | 2.25 | .25 | 2.50 |
| Reinforcing Bars | 2.15 | .20 | 2.35 |
| Wire Rods | 2.15 | .15 | 2.30 |
| Wire | 2.75 | .30 | 3.05 |
| Nails, Staples | 2.90 | .35 | 3.25 |
| Tin Plate | 5.00 | .25 | 5.25 |
| Terne Plate | 4.30 | .25 | 4.55 |
| Long Ternes | 3.80 | .25 | 4.05 |
| H. R. Sheets | 2.20 | .225 | 2.425 |
| C. R. Sheets | 3.05 | .225 | 3.275 |
| Galv. Sheets | 3.70 | .35 | 4.05 |
| Enameling Sheets | 2.85 | .35 | 3.20 |
| Electrical Sheets, Field | 3.30 | .60 | 3.90 |
| Electrical Sheets, Armature | 3.65 | .60 | 4.25 |
| Electrical Sheets, Electrical | 4.15 | .60 | 4.75 |
| Electrical Sheets, Motor | 5.05 | .375 | 5.425 |
| Electrical Sheets, Dynamo | 5.75 | .375 | 6.125 |
| H. R. Strip, 6" and under | 2.10 | .35 | 2.45 |
| H. R. Strip, Wider than 6" | 2.10 | .25 | 2.35 |
| C. R. Strip | 2.80 | .25 | 3.05 |
| Track Spikes | 3.25 | .40 | 3.65 |
| C. F. Bars | 2.75 | .35 | 3.10 |

Twisted barbed and barbless wire was increased .35 cents; wire fencing, including woven, chain link and lawn, .25 cents; bale ties, .325 cents. These products are sold on a column basis.

*After being idle for more than four weeks, some of the 38,000 Ford Motor Co. workers punch in at the time clock at the Ford plant in Dearborn, Mich. NEA photo*

Fence posts and accessories were advanced .25 cents.

On pipe and oil country tubular goods, OPA allowed increases of $6 a net ton on buttweld and lapweld and $5 a net ton on electric weld and seamless. New cards issued by producers will reduce discounts on lapweld and buttweld by 3 points and on seamless and electric weld by 2½ points.

On all alloy steel products except stainless, the seller may increase the applicable maximum price (base price plus extras) by 4 per cent.

Further clarification of the alloy steel increase is being awaited as producers are uncertain as to how the advance will be applied.

Stainless steel prices, control of which was suspended last October, were advanced 8.2 per cent last week by Allegheny Ludlum Steel Corp., Brackenridge, Pa., and Crucible Steel Co. of America, New York. The increase is equivalent to that granted steel producers by OPA in the averaged realized price of all steel products.

Tool steel and specialty steels, both carbon and alloy, produced by tool steel producers, are increased 8.2 per cent.

Carbon and alloy steel tubing (other than oil country tubular goods and carbon steel pipe) are increased 6.6 per cent for hot-finished products; 9.9 per cent on cold-finished products, and 8.2 per cent on applicable maximum extras and other charges.

Steel screen wire cloth was advanced 8.2 per cent.

Carbon steel products such as poultry netting, hardware cloth and wrought iron (but exclusive of new products priced by special order and for which industry-wide prices have not yet been established) are increased 8.2 per cent.

Fabricated concrete reinforcing bars were advanced .20 a pound.

## Truman Limits Pay Raise Proposal to Basic Plants

Strikebound steel fabricating plants and their thousands of employees found little comfort last week in the statement by President Truman that his 18½-cent hourly wage recommendation applied not to them but only to the basic steel industry. The President urged that

direct negotiations be held to gain settlements in the struck fabricating plants.

Opposed to Mr. Truman's statement is the policy of the United Steelworkers not to accept any agreement with a fabricating company providing for an increase of less than 18½ cents an hour. Attempts at collective bargaining by fabricators with union locals at lower figures have proved to be of no avail. In a number of instances, fabricating companies have reached agreements with their own employees only to have them thrown out by top union officials. The Lockhart Iron & Steel Co., McKees Rocks, Pa., for example negotiated a 15-cent an hour increase with its 400 employees and started to resume operations last week. However, firm orders from the CIO International, which must approve all wage agreements, were to stop the back to work movement unless the wage increase was raised to 18½ cents.

President Truman's statement that the 18½-cent hourly increase recommendation was never intended to apply to the fabricators was made to representatives of the Tristate Industrial Association, Pittsburgh, in Washington. Association members informed the President that direct negotiations at any lower figure were impossible because of the "take it or else" demand for 18½ cents by the union. The Chief Executive then suggested the fabricators confer with Paul Porter, OPA chief, in an attempt to obtain price relief. OPA last week was reported to be considering a flat 10 to 15 per cent increase in prices of fabricators' products.

### Ask Assurance of Price Relief

Association executives point out that the basic steel industry was assured a $5 a ton price increase would be forthcoming before the industry granted the wage increase.

Cognizant of the dilemma in which fabricating companies find themselves under the government's wage-price policy, E. T. Weir, chairman, National Steel Corp., recently stated that, "the government's half settlement of the steel strike aims a death blow at small business and, consequently, at the livelihood of millions of persons. Never in history has there been such chaos in small business," Mr. Weir stated. "These companies are remaining strikebound because they are caught in a vise between higher prices of basic steel and paying higher wages themselves without price relief.

"There is a grim warning in the government's method of settling the steel strike," Mr. Weir said. "If this method becomes government policy, as is indicated, we will have consequences far worse than the most disastrous strike imaginable."

# Steel Fact-Finding Board Says Wage Boost "Well Within Limits"

*President's panel has no facts and no recommendations, but submits "historical record" justifying strike and settlement. Asserts work stoppage was not breach of contract, as contended by companies*

THE President's steel fact-finding board, whose three members have been collecting $100 a day each since last Dec. 31, has submitted a "terminal report" to Mr. Truman.

The report contains no finding of fact and no recommendations. The board held no hearings. The dispute between the United States Steel Corp. and United Steelworkers was settled two weeks before the board's report was submitted.

The fact-finders characterize the report as "primarily a historical record" submitted "for such purpose as the President may deem appropriate."

The board's report covers four subjects: Nature and background of the dispute; developments subsequent to the appointment of the board; analysis of governmental and published nongovernmental data pertaining to wage equities; analysis of the strike as an alleged breach of contract.

### Upholds Wage Increase

The amount of the wage increase recommended by the President, 18½ cents an hour, "is well within the limits" indicated by government data, the board concluded. This conclusion apparently is based partially on the findings of other fact-finding boards and partially on the premise that the workers' wartime take-home pay should be maintained.

However, the board found that on the basis of a 33 per cent increase in the cost of living from January, 1941, to September, 1945, and an increase of 20.3 cents in the average hourly straight-time earnings, an increase of only 7.8 cents an hour would be needed.

To protect the take-home weekly pay of the workers, the board concluded that on the assumption the work-week would return to the 1942 average of 40.2 hours, an increase of 22.6 cents an hour would be required to hold such earnings at the level attained in 1944 when the work-week averaged 46.3 hours.

Assuming a return to an average work-week of 39 hours, as in 1941, the board found an increase of 27.9 cents an hour would be required to hold weekly take-home at the war-time peak.

Discussing the strike as a breach of contract issue, the board said the terms of the contract relating to the general levels were not fixed for the duration of the agreement. The wage issue was expressly made subject to reopening on a change of national policy. Such a change had been officially declared and the wage issue was remanded by the War Labor Board to the parties for final settlement by collective bargaining.

"A construction of the contract which would extend the specific no-strike provisions to the demand for a general wage increase would in effect leave the final determination of the wage issue to the sole discretion of the company. In the absence of an overriding contractual limitation to that effect, the remand of the wage to the parties for collective bargaining carried with it the right to strike if such bargaining reached an impasse."

In steel circles, this "historical document" is not considered likely to have any weighty effect on future labor relations. However, spokesmen considered it disappointing in two respects. First, the position taken that the strike was not a violation of the contract may weaken the new contracts now in force. Second, it is considered possible the union at some future date may seize upon the board's conclusion that increases of 22.6 or 27.9 cents would be necessary to maintain take-home wage at 1944 levels as a springboard for future wage demands.

## Lake Seamen Pay Increase Reported Being Considered

Expectations are that wages of seamen on the Great Lakes will be raised for the 1946 season of navigation in line with the 18½ cents an hour increase in wages granted steelworkers under the new government wage-price policy.

The Lake Carriers Association, Cleveland, composed of lake vessel operators, is understood to have appointed a fact-finding commission which is expected to make a recommendation before the end of March.

Lake navigation is not expected to open for another month though fitting out of some vessels is being started.

# Widespread Labor Unrest Persists

*Major industrial disputes continue despite steel strike settlement. Thousands of workers involved in current stoppages*

MORE THAN three weeks have elapsed since the strike in the iron and steel industry was settled, but any hope that this settlement would be quickly followed by pacification of the turbulent national labor situation and resumption of reconversion production on a broad scale has proved forlorn.

In some respects, the outlook for early labor peace is more uncertain than ever because of the confusing situation arising in industry generally as a result of the steel settlement based on the government's new wage-price policy. Large-scale strikes in the automotive and electrical manufacturing industries continue; new nation-wide strikes in the bituminous coal mining and the railroad industries are threatened, while scores of medium and small manufacturing firms are closed by strikes, or threatened with closing over coming weeks, unless their wage-price problems are solved.

Exact figures on the number of workers involved in current strikes are not available but estimates range close to 1,000,000, to which may be added around 300,000 railroad workers, though strike in this field, it is believed, will at least be temporarily averted. Looming a little farther in the future, April 1 to be exact, is a possible strike in the soft coal industry which, if called, will involve some 400,000 miners.

### January Strikes Total 500

Latest figures released by the Bureau of Labor Statistics, Department of Labor, show the number of workers made idle by strikes and lockouts in January was record-breaking. The number of workers involved directly in these work stoppages totaled 1,750,000, preliminary estimates show. During the month there were a total of 500 work stoppages, only 174 of which had been terminated by the end of the month. In addition there were 553 controversies where no immediate threat of work stoppage was presented, and 358 disputes where work stoppages were threatened in which the Conciliation Service helped in adjustments.

January strikes caused a loss of 19,200,000 man days, or 3.13 per cent of available working time. Four large strikes, General Motors, steel, electrical and meat packing, accounted for three-quarters of the total. Man-days of idleness in January, 1945, amounted to 184,000 while the percentage of available working time idle in that month was .02 per cent. Average number of strikes in January of the 1935-1939 period, according to the BLS, was 170 with an average of 62,000 workers involved and an average of 1,013,000 man-days lost.

Termination of the steel strike about mid-February, it is pointed out, probably will be reflected in some improvement in the statistical showing for that month as regards lost time due to strikes. However, March may reverse this trend.

*Representatives of soft coal producers confer in Washington on ways to settle the wage demands of the United Mine Workers "with a minimum of friction." Left to right: Harry M. Moses, Pittsburgh, representing steel companies' captive mines; Charles O'Neill, Altoona, Pa., spokesman for the Operators' Negotiating Committee; Ezra Van Horn, Cleveland, chairman of the committee; Edward R. Burke, representing southern operators; Kenneth Spencer, Kansas City, Mo., representing western operators*

Strikers' nerves are beginning to become frayed from the prolonged walkouts in the automotive and electrical industries and in some cases pickets and strike sympathizers are resorting to hoodlum tactics in blockading plant entrances. In an increasing number of instances CIO union strikers at widely separated points in the electrical industry have staged mass parades and picketing in defiance of court injunctions. The technique of these demonstrations appears uniform, leading observers to the view that flouting of court orders has been adopted as general policy by the strikers, possibly as a means of dramatizing the strike.

## Coal Operators To Meet Mar. 12 with Union On New Wage Contract as Strike Threatens

BITUMINOUS coal mine operators will open negotiations with John L. Lewis and other representatives of the United Mine Workers of America in Washington March 12 on a new union wage contract. Upon the outcome of the negotiations will hinge whether a paralyzing coal strike will be called sometime after April 1.

The conference with the operators will follow a meeting of the union's policy committee on March 11 at which the union's demands will be formally outlined. The miners, among other demands, are expected to ask for a 5-day 35-hour week at the same pay as is now received for six days' work. Also, renewal of a demand for a welfare fund royalty of 10 cents a ton on all coal mined is anticipated, while the issue of enrolling mine foremen in units affiliated with the United Mine Workers also may be a major issue.

Replying to Lewis' request for a conference, the mine operators pointed out that the price increase which would follow any pay increase granted the 400,000

miners would penalize the industry in its competition with other fuels. Charles O'Neill and Edward R. Burke, representing the northern Appalachian region and southern producers' groups, said labor costs now represented 65 per cent of the cost of an average ton of coal at the mines, amounting to an average of $2.93.

The operators suggested that if Lewis wanted to re-open the foremen's issue that he return to the open shop status prevailing prior to 1939, contending they agreed to grant a union shop on April 1, 1939 in return for Lewis' pledge to exempt management and supervisory personnel from eligibility for union membership.

On the question of wages and hours of work the operators suggested that the maximum work week be reviewed to determine whether any reduction would be justified at this time. The miners now are working a 54-hour week.

Most observers think the new government wage-price policy will get its severest test in the coal case. Some think that because of the rivalry within the labor movement Lewis may make wage demands substantially higher than the increase of 18½ cents per hour which Philip Murray obtained for the United Steelworkers.

### Wage Rates Technically Unchanged

Technically the wage rates of soft coal miners have not been increased since the spring of 1941. At that time they received an increase of $1 in the basic rate for a 7-hour day in the North, bringing the rate up to $7. Southern miners received $1.40 to bring their rate up to the northern rate. Increases in 1943 and 1945 were largely so-called "fringe" wages, chiefly being payments for travel time and overtime, not being increases in basic rates as such.

In some governmental quarters it was reported reasoned last week that a minimum coal wage increase of 14 cents an hour would be approvable for price-relief purposes under the terms of the government's wage-price policy.

Strike in the bituminous coal mines would relatively quickly be reflected in steel and manufacturing operations. Stocks of solid fuels in consumers' hands for the most part are small despite feverish efforts over the immediate past to build inventories. In the steel industry it is estimated stocks are sufficient to support operations for from two to six weeks, time varying between plants.

In the Pittsburgh district a coal strike would tie up steel operations within two weeks. Some mills would be forced to shut down within 8 days. During the steel strike Jones & Laughlin Steel Corp. stored 250,000 tons of coal. However, this tonnage would be adequate for only 10 days' operations. The Clairton by-product coke works of Carnegie-Illinois Steel Corp. is estimated to have 10 days' supply.

Chicago district steel plants having restored operations to 74 per cent of ingot capacity, see their goal of full production threatened should a coal strike be called early in April. Inventories of coal average three weeks or less. Thus, a mine shut-down would be reflected in steelmaking operations almost immediately.

Although coal mines operated during the steel strike, their output in general could not be shipped to mills. A considerable portion was diverted to other consumers. Consequently, the steel industry is as short of coal as it has been since last fall when a miners' strike ate into stocks.

Approximately 35 Chicago district blast furnaces were running last week, compared with 32 a week ago. Restoring of stacks to blast has not been as rapid as anticipated, due partly to manpower shortage and partly to delay in readying equipment. Production of steel ingots has expanded at a faster rate than was thought possible. On the other hand, rolling and finishing facilities have not kept pace with ingot output, because, despite maintenance efforts carried on during the strike, some damage to equipment was suffered.

Steel producers' coal stocks in the Cleveland district are reported fair. Two interests have sufficient inventory for six weeks' operations, while the third reports it has a three to four weeks' supply.

In the East steelmakers are estimated to have not more than 10 days' to two weeks' supply of coal on hand. The producers' position with respect to coal supply was not appreciably improved during the steel strike because of inability to unload coal cars and the fact that much of the fuel went to the railroads. A coal strike in April, consequently, would quickly force sharp curtailment in area steel production.

# Present, Past and Pending

### ■ GENEVA STEEL PLANT BIDS TO CLOSE MAY 1

WASHINGTON—Closing date for sealed bids or proposals for the purchase or lease of the Geneva, Utah, steel plant has been extended 30 days further to May 1, by the War Assets Corp.

### ■ JACK & HEINTZ MERGES WITH PRECISION PRODUCTS

CLEVELAND—Jack & Heintz Inc. of this city and Precision Products Corp., newly formed Delaware corporation, have merged. The new company, Jack & Heintz Precision Industries Inc., will make airplane starters and generators, fractional horsepower electric motors, ball and roller bearings, electronic gages and measuring devices, precision machine tools, and other products.

### ■ RELIANCE ELECTRIC TO BUILD $750,000 PLANT

ASHTABULA, O.—Reliance Electric & Engineering Co., Cleveland, plans to expand its electric motor and V-S drives production facilities by building a $750,000 plant here. A like amount will be expended for machinery and equipment.

### ■ COLUMBIA PIPE & SUPPLY BUILDING NEW PLANT

CHICAGO—Columbia Pipe & Supply Co., this city, is building a $225,000 plant, scheduled for operation about May 1.

### ■ REYNOLDS METALS CO. LEASES ROLLING MILL

WASHINGTON—War Assets Corp. has leased the aluminum sheet rolling mill at McCook, Ill., to Reynolds Metals Co., Richmond, Va. Reynolds will use the plant to make corrugated roofing, siding, door molding and window trim for the building industry.

### ■ UTILITY INDUSTRY'S CONSTRUCTION PROGRAM CUT

NEW YORK—Privately-owned electric utility industry will spend no more than $300 million for capital additions and improvements this year compared with earlier plans for a $750 million program, according to trade estimates.

### ■ TREND TO WELDED FREIGHT CARS SEEN POSSIBLE

PITTSBURGH—Railroad car builders have increased their welding facilities and full utilization of such equipment may cause a trend to welded freight cars, says Malcolm Priest, manager, Railroad Research Bureau, United States Steel Corp.

### ■ BRAZILIAN STEEL PLANT READIED FOR OPERATION

WASHINGTON—Cia Siderurgia Necional, Volta Redonda, Brazil, the largest steel plant in Latin America, is scheduled to start production this month.

# Price, Supply Problems Expected To Plague Industry for Months

*Business prospects for 1946 excellent in most segments of metalworking industry, manufacturers tell meeting of National Supply & Machinery Manufacturers Association. Difficulties in adjusting to peacetime will persist*

EXCELLENT business is in prospect for most segments of the metalworking industry although ceiling prices and material shortages will continue to plague many companies for months to come.

This was the consensus of 11 manufacturers who informally discussed current business conditions and factors affecting the future before members of the National Supply & Machinery Manufacturers Association in Cleveland Feb. 28.

**Power Transmission Equipment** — W. W. French, advertising manager, Dodge Mfg. Co., Mishawaka, Ind., said many industries have been able to buy only emergency equipment for a long time and many now must launch modernization programs.

His own company, he said, had no particular reconversion problem. It continued to make transmission equipment during the war, at the same time producing bearings for the Navy. Production capacity was stepped up during the war by enlarging the tool design department and using new, high speed machine tools.

**Cutting Tools** — The metal-cutting tool business still is in "hectic shape," W. P. Ross, vice president and director of sales, the Standard Tool Co., Cleveland, said, but, on the basis of a tour just made of the country, he feels that business will be excellent for the next four to five years. He urged distributors to buy as many small tools as possible, since, for example, "a ½-in. drill will always be the same."

All standard government-owned small tools are being returned to manufacturers and sold in the ratio of one to three new tools. This makes it possible to maintain prices for distributors, he said. His company is losing money on some items, making a little money on a few.

**Pipe Tools**—Manufacture of pipe machinery is being hindered by lack of castings, E. R. Barkley, vice president in charge of sales, Beaver Pipe Tools Inc., Beaver Falls, Pa., said. The situation now is more serious than during the war with most foundries operating at only 30 to 50 per cent of normal.

His company also faces the problem of short production runs, which means that a day is lost every time equipment is torn down and set up for a new job. Will prices rise? "I hope so," he said.

**Bearing Metals**—E. N. Beisheim, sales manager, Johnson Bronze Co., New Castle, Pa., said his company is busily engaged in building up factory and warehouse stocks which were largely depleted during the war. Excellent business is seen ahead and he urged distributors to examine their stocks and replenish them where necessary. His own company will carry the largest stocks in history.

Deliveries of items not in stock now are being made in four to six weeks, which represents a considerable improvement over a few months ago when four to six months were quoted. He expects prices to rise before the summer is over.

**Steel Pipe**—The steel industry has not fully recovered from the coal strike last fall and the situation has been further aggravated by the recent steel strike, with the result that delivery promises on pipe have been pushed ahead two months, according to F. H. Ramage, assistant manager, Pipe Division, Republic Steel Corp., Cleveland. Pipe promised for March now will be delivered in May, he said.

The main objective now is to replenish low jobber stocks. The quota system is being used to allocate tonnage. Trend toward smaller pipe sizes has cut down total tonnage available.

Mr. Ramage said he doubted merchant pipe production would overtake demand in 1946 but he felt the long-range view is excellent. Butt-weld pipe capacity is adequate for normal needs, he said.

**Carbide tools**—K. R. Beardslee, vice president, Carboloy Co. Inc., Detroit, envisioned a bright future for the cemented carbide industry, an industry which advanced 25 to 30 years in the five years of World War II. On V-J Day, production of cemented carbide products was 45 times greater than in 1939, he said.

The war brought into industry an entirely new group of machinists who are accustomed only to working with carbide tools, he said. Cemented carbide products now include wear resisting and machine parts, as well as cutting tools.

**Vises**—The vise industry booked a large volume of business after V-J Day

ACCIDENTAL DEMOLITION: Thousands of dollars worth of machinery was damaged when a 300-foot high brick-lined steel smoke stack fell the wrong way during wrecking operations of the old Pencoyd Iron Works outside of Philadelphia. The plant, operated during the war for export tonnage, is being torn down, but the building shown above was being used for storage purposes. NEA photo

and, in fact, unfilled orders now are running five times the 1940 average, according to Dan C. Swander Jr., secretary, Columbian Vise & Mfg. Co., Cleveland. Production up to the time of the steel strike was three times the 1940 average. Peak wartime production occurred in 1943 when volume was four times that of 1940. Production in 1945 was about two and half times that of 1940.

**Mechanical Rubber Goods**—Synthetic rubber is not a substitute for natural rubber, said C. F. Conner, Industrial Products Sales Division, B. F. Goodrich Co., Akron, O. Synthetic rubber products in many cases are superior to those made of natural rubber and, as far as costs are concerned, synthetic is interchangeable with natural, he said.

He pointed out that the British and Dutch have agreed upon a 20¼-cent price for natural rubber, fob Far Eastern ports. British growers wanted 36 cents but knew we were no longer dependent because of our large synthetic rubber industry. He said it appears that OPA will permit an increase in rubber product prices but less than 10 per cent in the case of hose and belting. Excessive demand now exists for all types of belting and long rubber hose. He notes a trend toward use of synthetic fibers and steel for reinforcing rubber products.

He advised distributors against building up large inventories.

**Power Tools**—Operations are based on the ability to get materials, said Roger Tewksbury, president, Oster Mfg. Co., Cleveland. Power tools are assembled in considerable measure from parts obtained on the outside, but with great difficulty. A drill cannot be shipped without a cord and a switch, yet household appliance makers are competing for the same items, he said. Prices are expected to continue upward as the dollar cheapens.

**Chain, Hoists, Cranes and Trolleys**—The chain situation has not eased up and, in fact, is worse than during the war. The steel strike upset production schedules and it will be months before normal operations will be resumed. These were the comments of David J. Gemmell, general sales manager, Cleveland Chain & Mfg. Co., Cleveland.

As for materials, his company was told by one steel mill that order books were filled for 1946 and books for 1947 were not open as yet. Deliveries of chain attachments such as grab hooks and swivels also are far behind.

Money now is being lost on many items. Chain prices were frozen in 1941 and it already has been necessary to absorb one increase in steel prices and

(*Please turn to Page* 169)

# Kaiser-Frazer, Pinched by Short Steel Supply, Urge Allocation

*Newly formed auto company encounters difficulty in obtaining supplies. Steel producers deny discrimination in distributing tonnage. Scarcity of material accentuated by month-long steel strike and desire of producers to serve only regular customers*

CONFRONTED by the increasingly tight steel supply situation which has been accentuated by the recent month-long steel strike, Henry J. Kaiser and Joseph W. Frazer who head the Kaiser-Frazer Corp., newly organized automobile company, last week requested the government to resume allocation of steel to the automobile builders to permit "fair and equitable" distribution. At the same time they asked the Department of Justice to look into the question of discrimination on the part of steelmakers in distributing available supplies.

The Department of Justice stated it had received the Kaiser protest and said the matter was being investigated. It was also pointed out in Washington circles that the Civilian Production Administration has the power to give the Kaiser interests priorities on steel, but that agency said it had received no requests from Kaiser for such assistance. If such a request were made it would be treated like any other.

At a press conference in New York Messrs. Kaiser and Frazer said that as a result of the steel industry's policy of distributing available tonnage on quota to regular customers their company had found it impossible to obtain shipment commitments from the steel producers.

### Only Regular Customers Supplied

They said top executives of their company had made a thorough canvass of the steel trade, contacting all of the larger producing companies, but in all instances the "story was much the same," that the steel producers were already oversold and that they first had to take care of their regular customers.

Mr. Frazer said Great Lakes Steel Corp. said it would arrange to furnish Kaiser-Frazer with some steel if the latter could show it could obtain steel from another steel producer. Mr. Kaiser told the reporters Bethlehem Steel officials said they might be able to provide Kaiser-Frazer with some steel but they did not say how much, or when, declaring it would be at least 30 days before they knew where they stood because of the situation at Bethlehem's Lackawanna plant which was in need of extensive repairs as a result of damage occasioned by the recent steel strike. In only three instances, Mr. Kaiser said, were they given any encouragement with respect to obtaining supplies of steel.

It was intimated at the press conference that the Kaiser-Frazer officials felt the squeeze was being put on them by the steel producers because of Kaiser's wage position in the recent steel strike. Kaiser's Fontana, Calif., steelworks was not strikebound because it signed with the union for the 18½ cents per hour increase in wages immediately after President Truman advanced that figure as the basis for averting the strike. In this connection the name of T. M. Girdler, chairman, Republic Steel Corp., was mentioned.

### Suggests Remedies for Situation

In a formal statement Mr. Kaiser said he was taking steps to remedy the supply situation confronting them, including possibly entering a bid for the $93 million government-owned steel plant at South Chicago, Ill., operated during the war by Republic Steel Corp. It would take at least a year to put this plant in shape to produce automobile sheets since a strip mill and other facilities would have to be installed. Steps taken for relief as given in the formal statement are:

"1. We have expressed our belief that a failure on the part of industry to cooperate in this critical emergency will necessitate action on the part of the stabilization administrator.

"2. We have approached Mr. Bowles with the request that he study such allocation of steel as would be fair and equitable for all producers. This would preserve that competitive force which is so indispensable to the life of American industry.

"3. We have been obliged to lease from the government and to operate an aluminum ingot plant and an aluminum rolling mill in order to produce our own raw materials. In the aluminum industry we will welcome regulation from the OPA in our pricing of this light metal which is also in critical shortage. Only recently we were advised that the earliest delivery of aluminum which we could expect was 48 weeks, which comes dangerously close to being a year.

"4. Finally, the shortage of steel sheet

(*Please turn to Page* 170)

# Auto Assembly Plant Projects Gain

*Pacific Coast industrialists anticipate sharp expansion in assembly operations as eastern manufacturers intensify activities in southern California. Shift of some plants to auto parts production seen*

*SAN FRANCISCO*

ALTHOUGH the West Coast, in the opinion of many industrialists, may not acquire an integrated automobile industry for a long time, perhaps never, the western area nevertheless is getting ready for a sharp expansion in the assembly of automobiles and trucks from major components manufactured in home factories in the East.

In addition, plans of a number of automobile manufacturers indicate that greater demands will be placed in the future on parts made on the West Coast.

For example, Studebaker Corp. which maintains a large assembly plant at Los Angeles plans to purchase as many items of its assembly in the southern California area as is possible.

A number of parts suppliers are planning expansion of facilities on the Coast to be in a better position to take care of assembly needs in the area. Ohio Rubber Co. recently announced a program to manufacture rubber floor mats and step plates in Long Beach, and Howard Zink Corp., an Ohio company, will produce auto seat covers at a Los Angeles plant, while United States Spring & Bumper Co. will make parts there. In the San Francisco area National Motor Bearing Co. is increasing its production of components.

### Other Firms May Shift to Auto Parts

As auto assembly operations increase in coming months, it is believed that a large number of aircraft parts makers will be able to shift production to auto parts. This also will be true, in smaller degree, to companies that produced ship parts during the war.

Meanwhile, the automakers themselves are planning to expand operations on the West Coast as soon as current conditions show a greater measure of settlement.

Nash is reported to be surveying the Coast area now for a plant site. Packard Motor Car Co. also is watching the Coast area closely for a possible move in this direction, although up to now conditions have not been decisive enough to complete planning.

General Motors has under construction at Van Nuys, Calif., an $8 million Chevrolet plant, which will be added to its present Coast set-up of Chevrolet and Fisher Body assembly plants in Oakland and a Buick-Pontiac-Oldsmobile assembly factory in southern California.

Ford recently began erection of a $4 million Mercury-Lincoln plant at Los Angeles to be added to its present assembly units at Richmond, on San Francisco Bay, and in Los Angeles.

Chrysler recently bought additional acreage at its plant site at San Leandro for expansion.

The annual report of the California State Reconstruction & Re-employment Commission for 1945 characterizes the state's economic prospect for 1946 as a period of "military danger passed, but economic danger just ahead."

It points out that serious bottlenecks and obstacles to readjustment are shortages in housing, transportation, materials, equipment and durable consumers' goods.

At the same time, the report indicates that California has emerged from the war in a considerably better condition than existed before the conflict began.

For example, while pointing out that employment in the state has only undergone a little more than half of its expected postwar initial decline, the committee expects manufacturing employment in 1946 will average 600,000 or more, which would compare with only 409,000 in April, 1940.

The report also says that while income payments in the state probably reached their highest annual rate in dollars about a year ago, the total income for Californians for 1946 is still expected to be $10 billion or more this year as compared with $5.6 billion in 1940. Net per capita income also will be higher than before the war. The rise in prices and income taxes since 1940 will probably reduce the net per capita buying power to about the 1940 level, the report says, but the total buying power of the people of California as a whole should be above that of 1940.

This estimate is based on a forecast that the state's population has grown to 9 million or more.

## Pacific Northwest Steel Mills Step Up Operations

Steel operations have been resumed at the two Seattle rolling mills, operations being estimated at about 75 per cent of capacity. Open hearth operations are higher than in the rolling mills where production will be steadily stepped up.

At the plant of Northwest Steel Rolling Mills Inc. work resumption was delayed for several days until a new union contract was signed. This is similar to that generally in effect in the industry calling for an increase of 18½ cents an hour. Yard and maintenance crews went to work immediately after the strike ended but operation of the rolling mills was not started until March.

Oregon Rolling Mills have been operating during the strike period under a special union arrangement.

Strike threats which have hung over 46 fabricating plants in Seattle have been lifted by agreement with two unions, while two others are to meet shortly. The expectation is they will also accept. The agreement involves the molders and foundry workers and the machinists. The blacksmiths' union and the boilermakers are expected to fall in line. These developments remove a cloud that has hung over the industry two months. The contract calls for a foundry helpers' scale of $1.05 an hour, an increase of 10 cents; $1.43 an hour for journeymen molders, increase of 18 cents, and 16-cent hourly increase for all classifications between helpers and journeymen. The machinists' agreement provides corresponding increases.

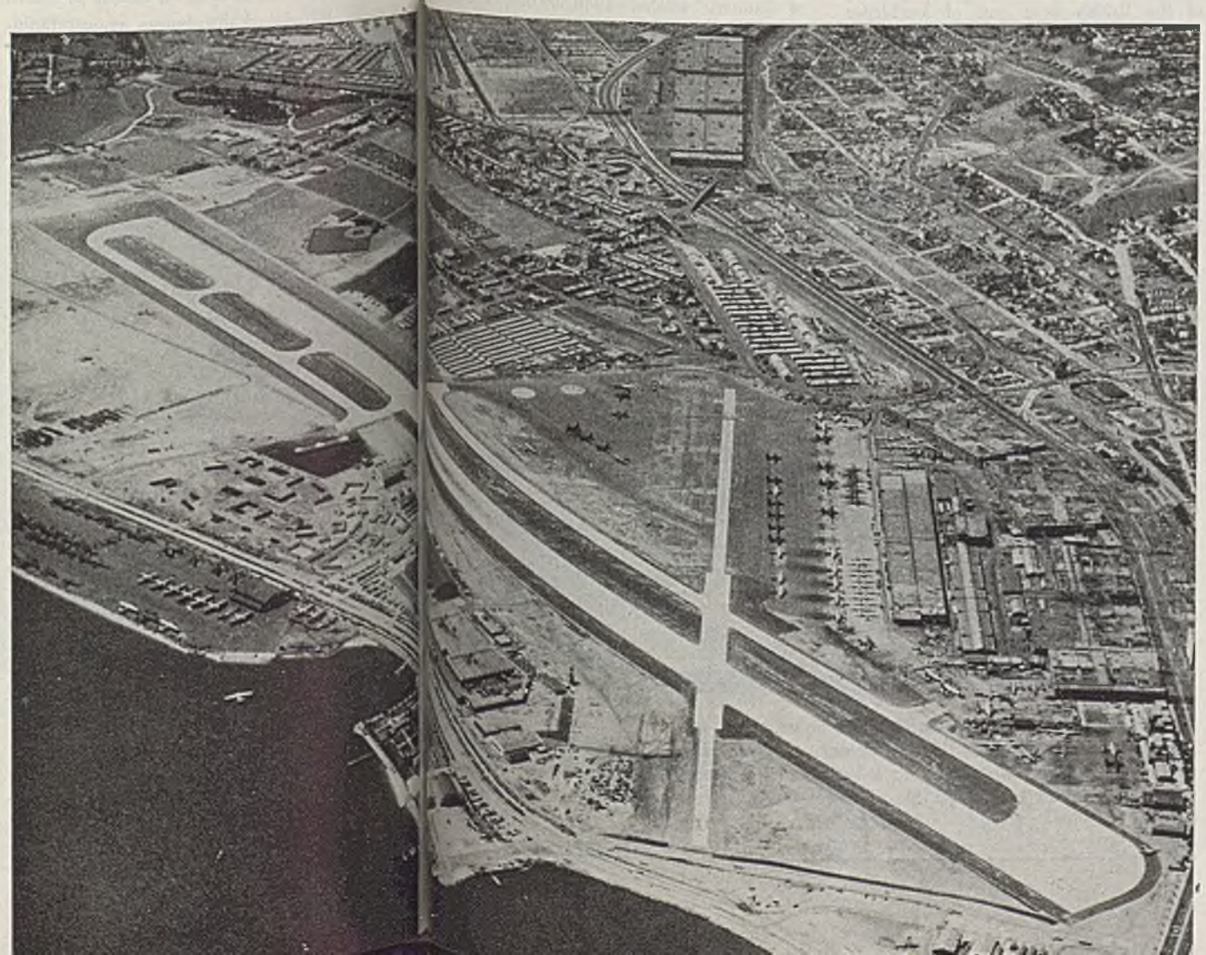
Seasonal layoffs and material shortages sketch a confused picture of unemployment conditions in Washington state. The state unemployment division and U. S. Employment Service in a state-wide survey report there has been a downward trend at Seattle and other larger cities in retail trade employment. This has been partially offset by gains in the aircraft industry. At Tacoma, shipyard layoffs have been heavy and industries which should have absorbed this surplus have been slowed by lack of material. At Bremerton the situation is serious because many persons, released from the Navy yard and other government jobs, are not eligible for unemployment insurance.

A. F. Hardy, state director of U. S. Employment Service, announces a state-wide campaign to find jobs for 18,000 war veterans. "The situation is particularly acute in this state," he said, "because of the severe effect of war contract terminations. More than 120,000 war workers have been displaced since V-J Day."

Of 87,000 Washington men discharged by Jan. 1, not more than 35,000 have found work, he added, while 60,000 more will be out of service by June 30. The situation has been somewhat relieved by veterans entering school and colleges instead of the labor market.

The Victoria Machinery Depot, Victoria, B. C., will launch its last wartime-built ship, the 1,350-ton *China Coaster*, early in March. After this contract is completed only repair crews will be employed.

Paul J. Raver, director of Bonneville Power Adm., reports that this utility in the fiscal year 1945 reached a new peak, delivering 8,513,125,169 kilowatt hours with a revenue of $22,990,018.



*Aerial view of Consolidated Vultee Aircraft Corp.'s San Diego, Calif., plant and the new 8700-foot runway on Lindbergh Field which was financed jointly by Convair and the Navy. Bounded by the main runway and the cross landing strip on the right side is Convair's main plant, still partially camouflaged. This plant now is building Convair 240 airliners and experimentally building the giant XC—99 six-engine military transport*

# Fabricators Are Awaiting Price Clarification

*Los Angeles manufacturers mark time pending removal of uncertainties in new wage-price situation*

*LOS ANGELES*

STEEL processing and fabricating industries in Los Angeles are marking time pending clarification of OPA steel price adjustments announced recently. Early resumption of wage negotiations with unions as well as an acceleration of business toward full reconversion hinges on how the fabricators' wage price problem is worked out.

Warehouses are in much the same situation, with relatively small turnovers due to continuing delays in steel deliveries from mills.

Officials of both industry and government declined to predict the manner or speed in which "business as usual" would be resumed once the pricing hurdles are out of the way.

Warehouses report an unprecedented number of customer-inquiries for scarce items and by some warehousemen this was interpreted as part and parcel of the existing confusion even within the trade as to future moves of federal agencies and possible aftermaths.

Steel production is recovering from the recent strike. Spokesmen for Kaiser, Columbia and Bethlehem, however, give different reports on current shipments. One company reports steel is being stored pending price clarification and another says shipments are going into customary channels at an increasing rate.

The RFC announced last week five surplus property plants in southern California have been sold to private owners. In addition, lease of the Bohn Aluminum & Brass Corp. plant in Los Angeles, built at a cost of $8,205,148, had been tentatively approved.

Cost, sale price and buyers of the factories sold are as follows:

Kaiser-Hughes & Hughes Tool Co., Culver City; $1,948,497; $856,500; Hughes Tool Co.

Vard Inc., Pasadena; $765,784; $509,000; Vard Inc.

Weber Showcase & Fixture Co., Los Angeles; $275,776; $225,000; Weber Showcase & Fixture Co.

Axelson Mfg. Co., Los Angeles; $271,947; $190,000; A. Moody & Co., Los Angeles.

# Return of Ferrous Scrap from Overseas War Areas To Be Small

*Total available to United States in European theater probably would amount to less than a month's requirement of purchased scrap with steel industry operating at capacity. Only small proportion expected to be shipped back*

WHILE no definite statistics are available for ferrous scrap imports from Europe, or the quantity of ferrous scrap still available in Europe for shipment to the United States, there is general agreement that the total tonnage will be small when measured by the yardstick of normal consumptive needs in this country.

Questioned on this subject, E. C. Barringer, president and executive secretary, Institute of Scrap Iron & Steel, told STEEL that he was loath to cite even approximate figures. Mr. Barringer was one of a party of scrap experts which recently scoured Europe on behalf of the War Department's Overseas Scrap Advisory Committee.

"If all the ferrous scrap available to us in Europe were brought to the United States," said Mr. Barringer, "it probably would not equal a month's requirements of purchased scrap with the steel industry operating at peak ingot production."

### Supply in Germany Uncertain

The reserve of scrap iron and steel in the American zone of occupation in Germany is difficult to determine, said Mr. Barringer.

"Take the city of Frankfort, with a population of 600,000. When our party was in Germany, it was estimated that much-bombed city held some 17 million tons of rubble of which only about 45,000 tons was ferrous scrap. Thus there was less potential scrap in this big city than there is steel in the skeleton of the Empire State Building in New York.

"And not all the scrap generated in the American zone will come to the United States. For example, the War Department last fall released some steel scrap to some German sheet mills to be rolled into badly needed roofing material.

"But a large quantity of scrap could be required from Germany as reparations," added Mr. Barringer, "and our committee felt that every effort to build up our depleted domestic reserves of ferrous metallics should be utilized."

While the War Department last year had a substantial quantity of ferrous scrap in France, said Mr. Barringer, most of it has been disposed of to the French. One of the principal reasons was that we originally expected to have this scrap prepared and handled by prisoners of war. This plan had to be abandoned because of rapid demobilization of our forces and repatriation of most of the prisoners. Substantially no scrap will come here from France.

Our fighting forces generated fairly large quantities of ferrous scrap in Italy, said Mr. Barringer, but this now has been pretty well cleaned up. Most of it was shipped to the United States in 1944 and 1945, while some of it—some 100,000 tons of light steel and alloy scrap—was sold locally to give the Italian economy a boost. Very little more ferrous scrap will come here from Italy.

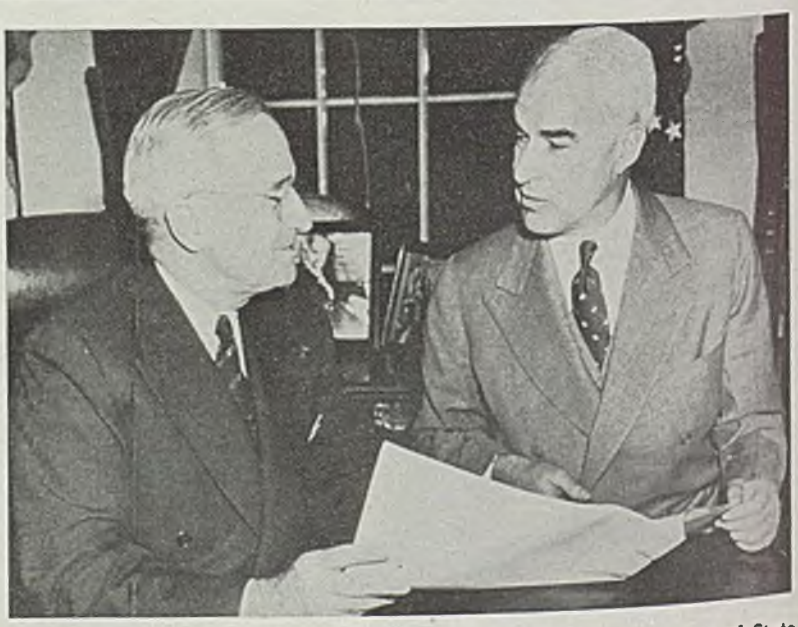
The small amount of ferrous scrap generated by our forces in the United Kingdom long ago passed into the hands of the British as a part of lend-lease settlement. In addition, said Mr. Barringer, the British can use all the scrap they can get from the zone they occupy in Germany, and they are making shipments right along. The British also have title to a lot of scrap in Belgium and the Netherlands and will need this. Scrap in the French zone of occupation in Germany will be shipped largely to France.

In view of this situation, the policy announced by the War Department on Jan. 21 is not expected to bring about any material increase in the reserves of ferrous metallics in the United States. This policy provides that "all ferrous scrap one-eighth inch in thickness and heavier will be returned to the United States from Germany where adequate manpower is available. In Japan, this material will be held pending further study." Ferrous scrap in other countries "will be returned to this country from overseas areas only to the extent required for ship's ballast."

## Surplus Sales, Inventories Increase, WAC Reports

Acquisitions in the 12 major categories of consumer goods for January totaled $326,502,000, while disposals amounted to $84,298,000, the War Assets Corp. has reported. Inventory of consumer goods continued to grow and at the end of January totaled $936,500,000. The month's sales realized 39.9 per cent of the reported cost.

Disposals of production materials and plant equipment increased 16 per cent



REPORTS ON UNO: Edward R. Stettinius, right, former Secretary of State and head of the United States delegation to the United Nations Organization, is pictured while making a report to President Truman. Mr. Stettinius was chairman of United States Steel Corp. before entering government service. NEA photo

in January over December, the previous peak month, to $64,500,000. Returns from the sale of this type of surplus totaled $30,800,000 in January, or 35 per cent more than in the previous month.

Disposals of surplus capital and producers' goods increased 30.4 per cent over December while declarations increased 32.5 per cent. On the other hand, 145 per cent more industrial plants and real estate was declared surplus for disposal in January than in the preceding month with sales increasing over December by 164 per cent. Cumulative sales through Jan. 31 of steel products totaled $25,115,000, or a recovery of 55.4 per cent based on reported cost of $45,281,000. Sheets, costing $5,561,000 returned $4,038,000; rolled plates that cost $4,899,000 sold for $3,251,000; pipe costing $4,119,000 brought $2,427,000; and tubing costing $3,977,000 sold for $1,603,000.

## Patent Applications Running 8000 Monthly

Applications for patents are now coming into the Patent Office at the highest rate in its history, more than 8000 per month, according to Casper W. Ooms, Commissioner of Patents.

The trend is characteristic of postwar after the Civil War, Spanish-American War and World War I. The boom in activity launched by World War I began with 70,000 applications in 1917, and continued in force until 1929, when an all-time total of 94,738 applications was recorded. Against this latter figure, there were actually granted 54,000 patents.

## Settle 15,000 Terminated Contracts in January

Over 15,000 terminated war contracts involving canceled commitments of $2.7 billion were settled by the government in January, Office of Contract Settlement has announced. This leaves a total of 41,000 terminated war contracts still awaiting settlement. Claims have been filed against almost 17,000 of these.

## OPA Approves Increased Ceilings for Casters

An industry-wide increase of 12.3 per cent in manufacturers' ceiling prices for washing machine casters over the levels prevailing on Oct. 1, 1941, has been announced by the Office of Price Administration. An increase of 7.3 per cent over the Oct. 1, 1941, levels in manufacturers' ceiling prices for other types of casters also was announced.

# Restrictions on Construction May Increase Demand for Surplus Plants

*Senate committee finds disposal process too slow. Report compliments Reconstruction Finance Corp. for recouping high percentage of cost but suggests prompt utilization of facilities might be more important to national interest*

GOVERNMENT restrictions placed on industrial construction for the purpose of saving scarce building materials and labor for residential building will greatly increase the demand for government-owned surplus plants and enhance the chance of speedy disposal—at least of the medium-sized, general-purpose plants, declares a progress report of the O'Mahoney surplus property subcommittee of the Senate Committee on Military Affairs.

But, the report says, the process of disposing of these plants is altogether too slow. "At the rate of plant disposal during January (57 plants representing an investment of $122 million) it will take a minimum of two years to dispose of the remaining 1369 plants by sale or lease. The cost rather than the number of plants is used as a criterion of disposal achievement; disposal of the remaining investment of $10.8 billion at the January rate will take approximately seven years."

### Wants Balanced Program

The report compliments the RFC on an outstanding job "in recouping for the public purse a high percentage of the original investment" but adds that "undue emphasis on this particular objective is not conducive to the development of a balanced plant disposal program in line with the Surplus Property Act.

"Overemphasis on high returns on individual sales," says the report, "is paralleled by an under-utilization of the contents of the plant reports submitted pursuant to Section 19 of the Surplus Property Act and the expert personnel which prepared these reports. One of the primary purposes of these plant reports is to insure an overall rather than a piecemeal approach to plant disposal in the most important industries in which expansion at government expense has taken place. The prompt and effective carrying out of the recommendations contained in the reports, unless disapproved by the Congress, is imperative . . . The know-how of the personnel has not in many instances been put to the best use by the negotiators who have represented RFC in disposal negotiations."

The report criticizes the RFC for failure to formulate and publicize disposal regulations covering plants "and considerable confusion exists on the part of potential purchasers as to the procedures which they must follow and can expect to be followed by the RFC with respect to plant disposal. Public advertising for bids—to cite only one example—although required by Surplus Property Regulation No. 10, is an empty gesture or even a perversion of the requirement if postponed until after the completion of negotiations with a given purchaser."

One reason for delay, the report goes on, is that the owning agencies (principally the RFC) are frequently undecided as to which plants should be retained for national defense purposes. Another reason for delay is that there is too much centralization in the hands of a few RFC officials in Washington; authority to dispose of plants should be delegated to the RFC field offices. The report closes with recommendations for a number of changes in procedure aimed at removing causes of present delays.

## $6 Billion Voluntarily Refunded in Excess Profits

More than $6 billion in excess profits have been voluntarily refunded by wartime contractors to the government since 1942, according to Attorney General Tom C. Clark.

About 350 law suits, involving approximately $240 million, are pending presently in the Tax Court of the United States. In addition, the Department of Justice is seeking direct refunds from wartime contractors of about $30 million through the federal district courts.

## Price Increase Announced For Temperature Controls

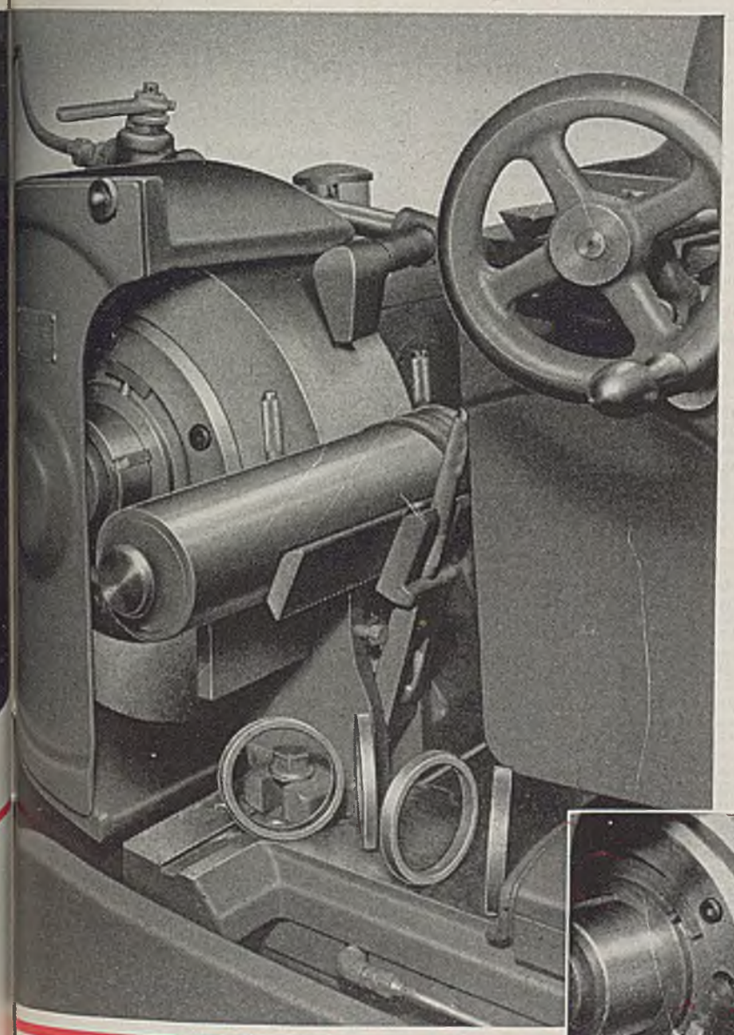
An increase of 5 per cent over Oct. 1, 1941, in manufacturers' prices for nonelectric temperature controls became effective as of Mar. 1, Office of Price Administration has announced. A profit factor of 6.2 per cent which manufacturers are to use if they apply for individual price adjustments was also set.

# GRINDING FIBER RINGS

## *2500 per hour thru-feed*

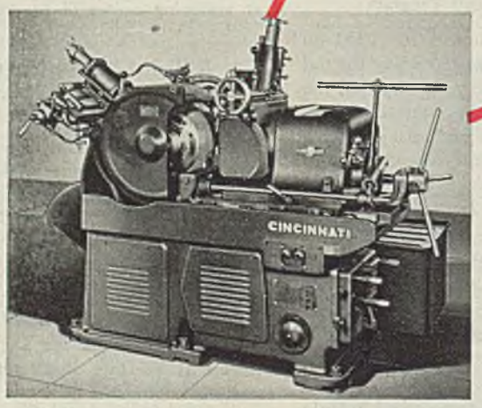
## *300 per hour infeed*

## ...another example of CINCINNATI CENTERLESS Production Possibilities



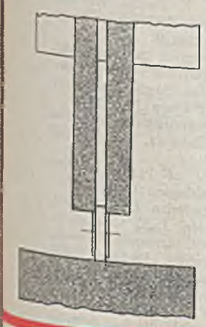
*Eight sizes of fiber rings, 1" to 4¾" diameter, and ⅜" thick are Thru-Feed ground on a* CINCINNATI *No. 2 Centerless, using interchangeable arbors. Production is 2500 per hour. Equipment includes Special Work Rest.*

*This is the second operation . . . infeed grinding the shoulders. Special equipment consists of Work Rest and Loading Device, two Grinding Wheels and Two-Wheel mount. Production averages 300 to 350 per hour.*

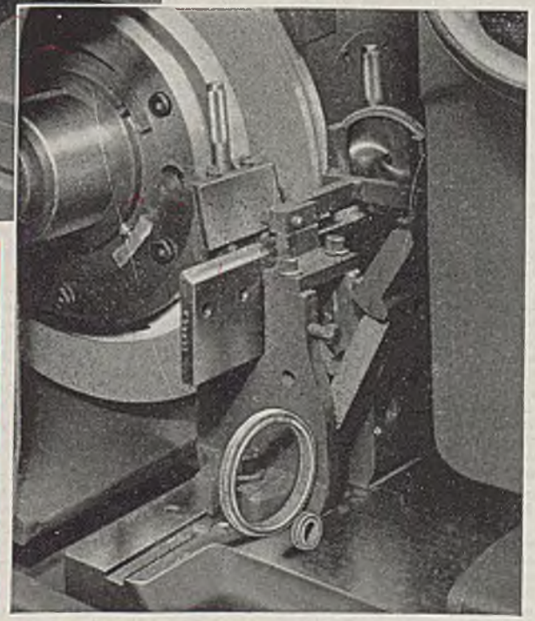



CINCINNATI *No. 2 Centerless Grinder. Complete specifications may be obtained by writing for Catalog G-456-2. A brief description is given in Sweet's Catalog File.*

In the development of centerless grinding methods, Cincinnati Application Engineers have made noteworthy strides. The illustrations on the opposite page are good examples. By equipping a CINCINNATI No. 2 Centerless Grinder with specially designed fixtures, grinding the O. D. and shoulders on fiber rings became a simple yet fast and accurate operation. ¶ The exigencies of the past few years have accentuated grinding developments for war needs. Now these methods are being applied to the production of peacetime goods made of ferrous and nonferrous metals, glass, plastics, hard rubber, cork, porcelain and other nonmetallic substances. It's quite possible that some of these developments could be worked into your own manufacturing schedules. Why not talk it over with the Cincinnati Application Engineers?



The sketch at the left illustrates the infeed operation of grinding the shoulders from the solid.



# CINCINNATI GRINDERS INCORPORATED

CINCINNATI 9, OHIO, U. S. A.

CENTER TYPE GRINDING MACHINES

CENTERLESS GRINDING MACHINES • CENTERLESS LAPPING MACHINES

# Foreign Purchasing Missions Maintained in U. S.

FOREIGN purchasing missions maintained in the United States and the names of representatives of foreign governments who may be consulted regarding purchases by their governments are contained in the following list compiled by the Office of International Trade. As a rule these missions buy on instructions from their governments or from importers. Experience of foreign traders indicates that in most cases the best promotion of business results from the cultivation of foreign importers and buyers. The list of foreign missions:

**AFGHANISTAN:** The Legation of Afghanistan, 2001—24th St. N.W., Washington 8; Mohammed Chouaib, Royal Afghan Consul, 340 Riverside Drive, New York; Mohammed Omar, Consul, Afghan American Trading Co. Inc., 226 West 26th St., New York.

**ARGENTINA:** Argentine Army Aeronautical Purchasing Commission, 1775 Broadway, New York 19; Argentine Government Oil Fields Commission in the U. S. (YPF), 80 Broad St., New York 4; Argentine Naval Commission, 1302—18th St. N.W., Washington 6; Rear Adm. Carlos Saravir, naval and air attache, Embassy of Argentina, 1302—18th St. N.W., Washington 6; Brig. Gen. Antonio Parodi, military attache, Embassy of Argentina, 1816 Corcoran St. N.W., Washington 9; Col. Alfredo Paladino, air attache, Embassy of Argentina, 1816 Corcoran St. N.W., Washington 9.

**BELGIUM:** Belgian Economic Mission, 1780 Massachusetts Ave. N.W., Washington 6; 630 Fifth Ave., New York 20 (By reason of the Economic Union this mission purchases for Luxemburg).

**BOLIVIA:** G. Rovira, Office of Commercial Counselor, 1115 Investment Bldg., Washington 5; Lt. Col. Alfredo Pacheco, president, Bolivian Army Purchasing Commission, Room 1125 Investment Bldg., 15th and K Sts. N.W., Washington 5; Rowland Egger, U. S. representative, Corporacion Boliviano de Fomento, 232 Barr Bldg., Washington 6; Yacimientos Tetroliferos Fiscales Bolivianos, c/o G. Rovira, 1115 Investment Bldg., Washington 5, c/o Arturo J. Machicao, Room 806 A, 270 Broadway, New York 7; Banco Minero de Bolivia, Attention: Mr. Foy, Chemical Bank and Trust Co., 165 Broadway, New York.

**BRAZIL:** Col. Faria Lima, chief, Brazilian Aeronautical Commission, 3402 Garfield St. N.W., Washington 7; Oswaldo B. Sampaio, Brazilian Government Airplane Engine Factory Commission, 60 East 42nd St., New York 17; Commander Benjamin Sodre, Officer-in-Charge, Brazilian Navy Purchasing Office, 3005—34th St. N.W., Washington 8; Lt. Col. Joao Valdetaro, chief, Brazilian Military Commission, 2134 Leroy Place N.W., Washington 8.

**BRITISH EMPIRE:** Commonwealth of Australia—War Supplies Procurement, 1700 Massachusetts Ave. N.W., Washington 6, or 61 Broadway, New York 6.

Great Britain—British Ministry of Supply Mission, 15 Broad St., New York 5; British Ministry of Supply Mission, 1800 K St. N.W., Washington 6; British Supply Council in North America, Willard Hotel, Washington. (Mail address: P. O. Box 680, Benjamin Franklin Station, Washington.)

Canada—Department of Munitions and Supply, Marshall Bldg., 1205—15th St. N.W., Washington 5.

India—Indian Supply Mission, 635 F St. N.W., Washington 4.

New Zealand—New Zealand Supply Mission, McGill Bldg., 908-910 G St. N.W., Washington 1.

Southern Rhodesia—Government of Southern Rhodesia, 905—15th St. N.W., Washington 5.

Union of South Africa—The Union of South Africa Government Supply Mission, 905—15th St. N.W., Washington 5.

All other British Empire and Colonial Purchases—British Colonies Supply Mission, 908-910 G St. N.W., Washington 1.

**CHILE:** Vice Adm. Emilio Daroch, Chilean Naval Commission, 2128 Bancroft Place N.W., Washington 8; Maj. Gen. Oscar Herreros W., chief, Chilean Air Force Commission, 2128 Bancroft Place N.W., Washington 8; Col. Ernesto Medina, chief, Chilean Military Mission, 2128 Bancroft Place N.W., Washington 8; Ramiro Pinochet, Chilean State Railways, 120 Broadway, New York 5; Corporacion de Fomento de la Produccion, 120 Broadway, New York 5.

**CHINA:** Chinese Supply Commission, 2311 Massachusetts Ave. N.W., Washington 8; Universal Trading Corp., 630 Fifth Ave., New York 20.

**COLOMBIA:** Col. Hernado Mora, military attache, 910 Seventeenth St. N.W. (Room 207), Washington 6; Eugenio Parra, representative of the National Railroads of Colombia, 610 Fifth Ave., New York; Edgar Wells, representative of Caja de Credito Agrario Industrial y Minero, 120 Wall St., New York.

**COSTA RICA:** His Excellency Francisco de P. Gutierrez, Ambassador of Costa Rica, 2112 S St. N.W., Washington 8.

**CUBA:** Lt. Comdr. Felipe E. Cadenas, naval attache, Embassy of Cuba, 2639 Sixteenth St. N.W., Washington 9; Capt. Efrain R. Hernandez, air and military attache, Embassy of Cuba, 2639 Sixteenth St. N.W., Washington 9; National Development Commission of Cuba, Frederick Snare Corp., 233 Broadway, New York 7.

**CZECHOSLOVAKIA:** Czechoslovak Embassy, 2349 Massachusetts Ave. N.W., Washington 8.

**DENMARK:** G. Seidenfaden, commercial attache, Economic Section, Danish Legation, 2343 Massachusetts Ave. N.W., Washington 8.

**DOMINICAN REPUBLIC:** His Excellency Emilio Garcia Godoy, Ambassador of the Dominican Republic, 4500 Sixteenth St. N.W., Washington 11; Capt. Amado Hernandez P., assistant military attache, Embassy of the Dominican Republic, 4500 Sixteenth St. N.W., Washington 11.

**ECUADOR:** Gen. Luis Larrea-Alba, military and air attache, Embassy of Ecuador, 2125 LeRoy Place, Washington 8; Jorge Reyes, financial counselor, Embassy of Ecuador, 2125 LeRoy Place, Washington 8.

**EGYPT:** Anis Azer, commercial counselor, Legation of Egypt, 2200 Kalorama Road N.W., Washington 8.

**EL SALVADOR:** Dr. Felipe Vega Gomez, first secretary, Embassy of El Salvador, 2400 Sixteenth St., Washington 9.

**ETHIOPIA:** Getahoun Tesemma, Charge d'Affaires ad interim, Legation of Ethiopia, 2134 Kalorama Road N.W., Washington 8.

**FINLAND:** Ragnar Smedslund, commercial counselor, Legation of Finland, 2144 Wyoming Ave. N.W., Washington 8.

**FRANCE AND FRENCH COLONIES:** Jean Monnet, commissioner at large of the French government, President of the French Supply Council, 1800 Massachusetts Ave. N.W., Washington 6.

The French Supply Council co-ordinates the activities of the following French Missions:

French Mission of the Ministry of Production—Andre Armengaud, chief, 1722 Massachusetts Ave. N.W., Washington 6.

French Mission for Food—Jean Dupard, chief, 1722 Massachusetts Ave. N.W., Washington 6.

French Mission of Agriculture—George Misse, chief, 1724—18th St. N.W., Washington 9.

French Mission of Railroads—Robert Leguille, chief, 1763 R St. N.W., Washington 9.

French Mission of North African Railroads—Noel Concordet, chief, 1763 R St. N.W., Washington 9.

French Mission of Public Works—Jean Georges Baudelaire, chief, 1763 R St. N.W., Washington 9.

French Mission for Medical Supplies—Dr. Jean F. Mabileau, chief, 1329—18th St. N.W., Washington 6.

French North Africa—Raymond Poitte, 1330—18th St. N.W., Washington 6.

French Colonial Agency in the United States—(French Colonies except North Africa) Maurice Andlauer, director, 111 Broadway, New York.

French Shipping and Transport Mission—Maurice Darondeau, deputy chief, 1809 R St. N.W., Washington 9.

French Tobacco Mission—Joseph Girard, chief, 700 Cathedral St., Baltimore 1.

French Mission of Reconstruction—Andre Monnier, chief, 2900 Adams Mill Road N.W., Washington 9.

French Transit Division—J. O. Senner, chief, 44 Beaver St., New York 4.

**GREECE:** Alexander Argyropoulos, resident minister, Greek Purchasing Mission, 2100 Massachusetts Ave. N.W., Washington 8.

**GREENLAND:** Danish Consulate General, Greenland Section, 17 Battery Place, New York 4.

**GUATEMALA:** Dr. Enrique Lopez-Herrarte, counselor, Embassy of Guatemala, 1614 Eighteenth St. N.W., Washington 9.

**HAITI:** His Excellency Jacques C. Antoine, Ambassador of Haiti, 4842 Sixteenth St. N.W., Washington 11.

**HONDURAS:** His Excellency Julian R. Caceres, Ambassador of Honduras, 2611 Woodley Place N.W., Washington 8.

**IRAN:** Iranian Consul in charge of Iranian Trade Commission, 30 Rockefeller Plaza, New York 20.

**IRAQ:** Legation of Iraq, 3141—34th St. N.W., Washington 8.

**ITALY:** Italian Technical Mission, Embassy of Italy, 2700 Sixteenth St. N.W., Washington 9.

**LUXEMBURG:** Belgian Economic Mission, 1780 Massachusetts Ave. N.W., Washington 6; also, 630 Fifth Ave., New York 20 (By reason of The Economic Union this Mission Purchases for Luxemburg); August Bohler, Industrial Advisor to the Luxemburg government, 235 East 22nd St., New York 10.

**MEXICO:** Economic Division, Embassy of Mexico, 2829—16th St. N.W., Washington 9; Brig. Gen. Cristobal Guzman Cardenas, military attache, Embassy of Mexico, 2829 Sixteenth St. N.W., Washington 9; Rear Adm. Ignacio Garcia Juarado, naval attache, Embassy of Mexico, 2829 Sixteenth St. N.W., Washington 9.

**NETHERLANDS:** Netherlands Purchasing Commission, 41 East 42nd St., New York 17; Netherlands Food Purchasing Bureau, Produce Exchange Bldg., 2 Broadway, New York.

**NEWFOUNDLAND:** Newfoundland Supply Liaison, 907 Fifteenth St. N.W., Washington 5.

**NICARAGUA:** Mrs. E. E. Perkins, vice consul, Embassy of Nicaragua, 1627 New Hampshire Ave. N.W., Washington 9.

**NORWAY:** Royal Norwegian Purchasing Mission (Military), 3409 Fulton St. N.W., Washington 7; Royal Norwegian Purchasing Agency (All other), 40 Exchange Place, New York.

**PANAMA:** J. E. Heurtematte, commercial counselor, Embassy of Panama, 2862 McGill Terrace, Washington 8.

**PARAGUAY:** Embassy of Paraguay, 5500 Sixteenth St. N.W., Washington 11.

**PERU:** Rear Adm. Federico Diaz Dulanto, Peruvian Naval Commission, 1320 Sixteenth St. N.W., Washington 6; Gen. Armando Revoredo, air attache to the Peruvian Embassy, 1320 Sixteenth St. N.W., Washington 6; Col. Jose M. Tamayo, chief, Peruvian Military Commission, 1701 H St. N.W., Washington 6; Sr. Carlos Donayre, commercial attache, Peruvian Embassy, 1320 Sixteenth St. N.W., Washington 6.

**PORTUGAL:** J. Freire d'Andrade, president, Portuguese Trade Commission, 630 Fifth Ave., New York 20.

**SPAIN:** Mariano de Yturralde, commercial attache to the Spanish Embassy, 1629 Columbia Road N.W., Washington 9.

**SWEDEN:** Swedish Legation, Commercial Section, 630 Fifth Ave., New York 20; also 1900—24th St. N.W., Washington 8.

**SYRIA:** Husni A. Sawwaf, counselor, Legation of Syria, 2215 Wyoming Ave., Washington 8.

**THAILAND:** Legation of Thailand, 2300 Kalorama Road N.W., Washington 8.

**TURKEY:** Ismail Kavadar, commercial at-

tache to the Turkish Embassy, 20 Exchange Place, New York.

RUSSIA: Amtorg Trading Corp., 210 Madison Ave., New York 16; Lt. Gen. Leonid G. Rudenko, The Government Purchasing Commission of the Soviet Union in the U. S. A., 3355 Sixteenth St. N.W., Washington 10.

URUGUAY: Gen. Hector J. Medina, head of Uruguayan Military Mission, Embassy of Uruguay, 2007 Massachusetts Ave. N.W., Washington 6; Lt. Comdr. Alfonso Delgado Pealer, head of Uruguayan Naval Mission, Embassy of Uruguay, 2007 Massachusetts Ave. N.W., Washington 6; Commercial and Financial Department of the Embassy of Uruguay, 1025 Connecticut Ave. N.W., Suite 303, Washington 6; Luis A. Cagno, Representative of Rione (hydroelectric work), 205 W. Wacker Drive, Room 1400, Chicago.

VENEZUELA: Col. Juan Jones-Parra, military attache, Embassy of Venezuela, 2409 California St. N.W., Washington 8; Lt. Comdr. Carlos Larrazabal, naval attache, Embassy of Venezuela, 2409 California St. N.W., Washington 8; Lt. Col. Jorge Marcano, air attache, 2409 California St. N.W., Washington 8; Dr. Enrique Gonzales Navas, special representative of the Ministry of Public Works of Venezuela, 30 Rockefeller Plaza, New York 20; J. M. Flores, purchasing agent, Ministry of Health and Sanitation of Venezuela, 335 W. 57th St., New York 19.

YUGOSLAVIA: Beno Habjanic, commercial attache, Yugoslav Embassy, 1520 Sixteenth St. N.W., Washington 6.

## Urges Industry To Set Up Definite Export Quotas

Allocation of a definite percentage of production for export was advocated before 1000 business men participating in the Chicago World Trade Conference by John Abbink, chairman of the National Foreign Trade Council.

Business, he said, is "far better able than government to allocate products, whether of industry or agriculture. It has the incentive to be fair because its future depends upon satisfied customers, and a comparatively few months of all-out production, freed from inexpert restriction, will greatly ease what seems now to be an extremely tight situation."

Declaring that "experience proves that warborn regimentation is rarely overcome unless it is eliminated at once when the threat to security is passed," Mr. Abbink urged that a definite set-aside of American production be agreed upon for overseas shipment.

The Chicago conference, held at the Edgewater Beach Hotel, was sponsored by the Chicago Association of Commerce and the Export Managers Club.

## Textile Machinery Imports By Canada Substantial

Canadian imports of textile machinery for the first half of 1945 amounted to $2,589,185, compared with $4,179,495 for all of 1944.

The United States and Great Britain were the chief sources of these imports, although Switzerland furnished some small quantities. All branches of Canada's textile industry is urgently in need of types of specialized textile machinery not made in Canada.

## Canada Building Several Hydroelectric Installations

Canada has under way several new construction projects for expanding the country's hydroelectric power resources.

Included are an additional generator to develop 70,000 horsepower, on the Welland river, to cost an estimated $7,500,000 (Canadian) scheduled for completion in August, 1947; a dam and power house at Stewartville, on the Madawaska river, to cost $8,970,000 for generation and $2,650,000 for transmission lines, 54,000 horsepower, to be completed by the end of 1947; and a third project, a dam and power house on the Ottawa river, about 100 miles northwest of Ottawa, to produce 400,000 horsepower, costing $50,000,000 for generators and $20,000,000 for transformer and transmission installations, to be completed in 1949.

# DeSeversky Contends Effect of Atomic Bombs Exaggerated; Fire Caused Most Damage

REPORTS of direct damage to Hiroshima and Nagasaki by atomic bombs were exaggerated and had these cities been of steel and concrete construction comparable to New York and Chicago the damage inflicted would have been no greater than that of a 10-ton blockbuster bomb.

These are the conclusions of Maj. Alexander deSeversky, who recently returned from a tour of the Pacific war area as a special consultant to Secretary of War Patterson.

"The destruction was entirely incendiary in character," reads Major deSeversky's report. "The deaths were due almost entirely to fire and falling structures. The atom-bomb blast collapsed the flimsy, half-rotted and top-heavy wooden houses, causing thousands of fires which immediately combined into one huge bonfire. The victims were caught and pinned in the debris where most of them perished in the many hours that the conflagration raged.

"Concrete buildings, even in the very heart of the bomb explosions remained erect, though most of them were gutted by the spreading fire. More than that, even flag poles, siren devices and other fragile objects on such buildings remained erect. There were no traces of unusual heat effects even on the tallest of the surviving buildings.

"The same bombs dropped in exactly the same way on a steel-and-concrete city like New York or Chicago would have done no more damage than a 10-ton blockbuster. Had Hiroshima and Nagasaki been modern concrete and steel cities, there would have been no wholesale collapse of houses, no bonfire and no such tremendous loss of life."

When war came, and the air threat became apparent, said Major deSeversky, the Japanese government encouraged the dispersal of industry into homes as an air-raid precaution. "The Japanese, by taking their industries out of fireproof, concrete buildings and spreading them through flimsy, inflammable living quarters, committed what I might term 'industrial hara-kiri.' The Home Industry of Japan was the first to go up in smoke."

The Japanese tried to put their industries underground but did not start soon enough, continued Major deSeversky. But the progress that was made—an appreciable part of the capacity for building aviation engines for the Japanese Navy was placed underground—showed that the improved safety in operation resulted in more efficient production.

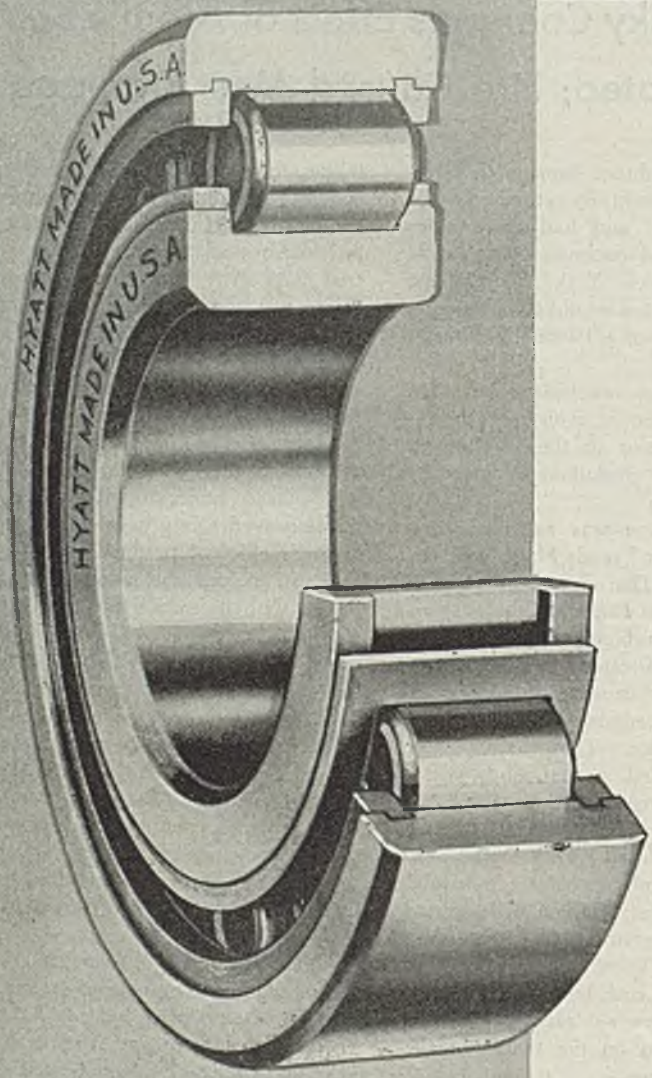
"Even before the atomic explosions, Japan, with its industries destroyed, and all the major cities but Kyoto reduced to ashes, was a thoroughly defeated and beaten nation. It was desperate to terminate hostilities—and it was searching for a face-saving device to protect the prestige of the government in order to avoid internal collapse. The atom bomb provided a perfect excuse for surrender. They could now pretend that they were not to blame for the defeat—an almost supernatural element had intervened to force their hand."

Major deSeversky's conclusions were contradicted by a number of atomic bomb experts when stated before the Senate Special Committee on Atomic Energy. Lt. Gen. Thomas F. Farrell testified that an atomic bomb explosion over New York would cause 120 to 140 times as much damage as a 10-ton blockbuster. Dr. Philip Morrison of the Los Alamos atomic bomb laboratory estimated casualties from such an explosion over New York would run from 30,000 to 200,000.

But Major deSeversky stuck by his guns and to refute the claim of experts that a 1000-mile-an-hour hurricane wind followed the blast of the atomic bomb, he showed pictures taken at Hiroshima and Nagasaki in which he pointed out lamp posts and narrow towers still standing.

# Rollers Roll—

## INCREASING MACHINE EFFICIENCY

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# HYATT ROLLER BEARINGS

By A. H. ALLEN *Detroit Editor, STEEL*

# mirrors of MOTORDOM

*Ford Rouge and Highland Park plants resume, after being stalled more than a month. New contract signed by Ford and union hailed as embodying significant forward steps in labor relations. Financial penalties against wildcat strikers dropped*

*DETROIT*

WHEELS began turning in manufacturing departments at the Ford Rouge and Highland Park plants again last week, after being stalled since Jan. 25. A week of building up floats was necessary before resumption of body assembly and final assembly lines, scheduled for this week. About 38,000 returned to work, including those at the Iron Mountain, Mich., station wagon plant and all Michigan "hydro" plants. Assemblies at first will be limited, but it is hoped to build them up rapidly to the point where the terrific overhead costs thus far experienced are reduced appreciably.

Lincoln plant continues short of supplies and will remain closed for the present. This division operated one week longer than other Ford units, but currently is having more than its share of parts troubles.

### Wildcat Strike Leaders Penalized

New union contract finally negotiated by Ford and the UAW was hailed by both parties as embodying significant forward steps in improved labor relations, which is probably a good sign. Reading through the 65 mimeographed pages of the document does not reveal to the disinterested observer any innovations which would appear to guarantee a high level of productivity or an end to work stoppages. However, the contract does provide that any employee guilty of instigating, fomenting or actively supporting, or giving leadership to illegal work stoppages is to be subject to discharge, and such cases will not be submitted to regular grievance procedure unless the local union, after formal investigation, should substantiate the contention of the affected employee that he was accused unjustly. There seem to be plenty of "outs" for the union in such terminology.

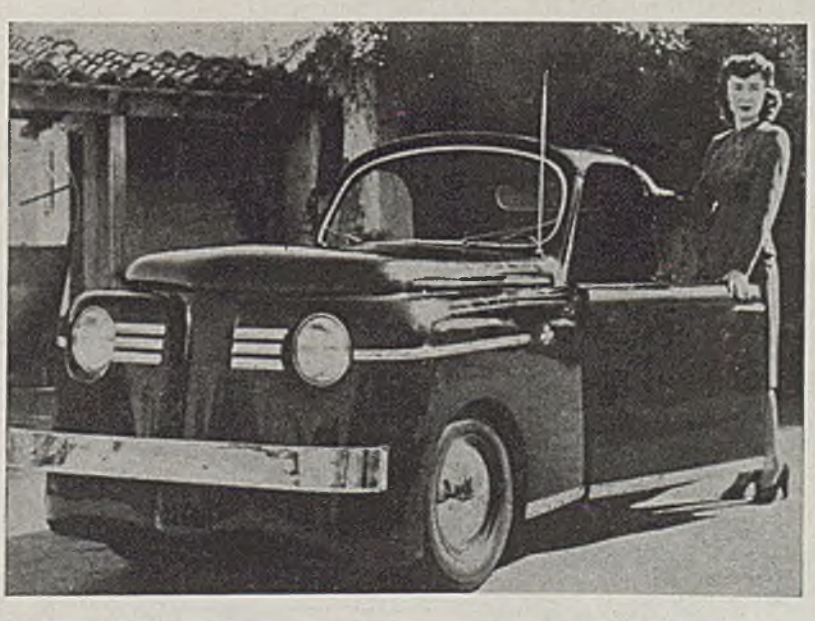
A new article in the agreement is devoted to management prerogatives and responsibilities, including a provision that continued failure of an employee to produce on the basis of established standards will be cause for discipline, including discharge, unless failure is due to causes beyond his control. Any employee who participates in any plan to control or limit production speed also will be subject to discharge. However, where disputes arise over production standards, the parties agree to retain the services of a mutually acceptable industrial engineering consultant to review the production standard in question and render a decision binding on the disputants.

Financial penalties against wildcat strikers, once actively discussed by both union and company, were dropped in the final version which, in addition to the provisions cited above, stipulates that employees participating in illegitimate strikes, but not guilty of "instigating, fomenting, actively supporting or giving leadership" shall be subject to the following penalties: First offense—reprimand to two weeks' suspension; second offense—reprimand to discharge. However, such penalties may be appealed by the union (and don't think they won't be) with a decision by an impartial umpire called for within 15 days after the penalty is imposed.

The company withdrew its demand for financial penalties upon the union's "representations and assurances that it would exert every possible effort and means at its disposal to stop or reduce to a negligible minimum such illegitimate strikes through its regular union procedures." The rest is up to the UAW, and if the experience over the next year and up to May 30, 1947, when the new contract expires, is as bad as in the past several years, then negotiations will be undertaken to invoke financial penalties.

All in all, it adds up to Ford taking another gamble on the union's ability to convince its members of the importance of high productivity and elimination of work stoppages. Failing this, both company and union stand to lose plenty, just as they stand to lose if Ford draws the short end of the gamble on pushing ahead with production at higher wages and higher all-around costs, in the hope that wage-price problems will resolve themselves.

The union naturally cheered the con-



PLASTIC BODY: The Bobbi Kar, small passenger car scheduled to be produced in San Diego, Calif., will feature a plastic body. It will have a 2-cylinder engine mounted in the rear. Weight will be between 500 and 800 pounds. NEA photo

tract because of many gains it represented to its membership. For one thing, the 18-cent wage increase was made retroactive to Jan. 5, instead of Jan. 26 as originally proposed. Average wage in Ford plants now is up to about $1.40 per hour. Vacation allowances have been liberalized—a man can be sick from 3 to 90 days a year without affecting his vacation pay, or he can be absent for 35 days for reasons of his own without being penalized. Apparently, too, more union committeemen will be paid full time for union business in the plants, the union claiming 263 men now being entitled to such payment against only 18 building chairmen previously. At the same time, this will result in a reduction in total number of union committeemen. Union shop and checkoff provisions remain unchanged.

Benson Ford, brother of the company's president and a director, has rejoined the company after three years in the Army. Before entering the service he spent some time in the purchasing department and Supercharger Division. Only 27, he will be given an executive assignment shortly. A third and still younger brother, William, reported to be the favorite of the three in the eyes of their grandfather, probably will follow in the footsteps of his two older brothers before too long, bringing three young Fords into the top management ranks of one of the largest manufacturing enterprises in the world.

A new type of sampling gun for taking hot metal samples for spectrographic analysis is in use at the Ford Rouge plant. It is a 10-inch pyrex glass tube, and is claimed to be safer, faster, cleaner and less expensive than the steel pin sample molds formerly used. Approximately 1200 are used daily. Specimens are ground on one end, placed in a holder and then mounted as electrodes in a 35,000-volt spectrograph where an arc is struck for 45 seconds to permit quantitative analysis. Ford chemists say they have developed a new type of meter spectroscope for analyzing magnesium and aluminum which eliminates all photography. In this setup, light radiations from the spark actuate a photoelectric cell with an amplifying power of 200,000 which records on a special meter the percentage of alloy constituents in the sample.

Nash production, which had been booming along at a rate of about 450 per day, is beginning to hit snags because of supply difficulties. About 75 per cent of Nash output has been in the smaller 600 series. It is the old story again of vendors being caught between higher labor rates and higher materials costs in the face of inability to raise prices.

Against the optimistic comment printed here last week about the outlook for truck and commercial car production must now be weighed two depressing notes. In the first place, the National Automobile Dealers Association hints the OPA may shortly announce new and lower truck ceiling prices on the theory that wartime increases were allowed because of limited production, and now the lid is off on production. In the second place, a number of parts suppliers, faced with the impossibility of furnishing truck parts under ceiling prices, have informed their customers it is impossible to schedule any production and to count them out as suppliers unless some price relief is forthcoming. These vendors are not inclined to "act tough," since many of them have enjoyed valuable business with truck manufacturers over the years. Now, however, they simply cannot produce without losing money, so they are forced to drop their truck business. This, of course, at once forces the truck companies to seek other sources which may not have supplied these parts formerly and which can therefore put a price on their product of about whatever they choose.

Possibility of a strike in 168 tool and die shops holding UAW-CIO contracts looks to have been forestalled with the offer of a 20-cent hourly increase, higher than the figure generally agreed upon by the steel and automotive industries, but in line percentagewise since base rates in the tool and die trade are well above those in the other industries. The raise will benefit about 6000 working in companies affiliated with the Automotive Tool & Die Manufacturers Association.

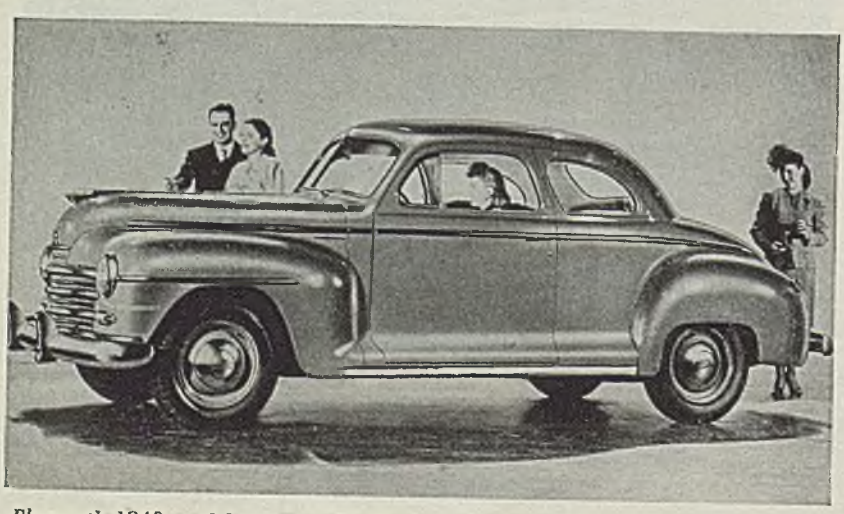
George W. Mason, president of Nash-Kelvinator Corp., was hurriedly elected president of the Automobile Manufacturers Association, almost before the ink was dry on the hunch carried here last week that the post might go to Paul Hoffman of Studebaker. The latter was named a vice president, along with Robert F. Black of White Motor. Albert Bradley of General Motors was named secretary and George Romney continues as general manager. Mr. Mason was wartime treasurer of the association, and in earlier years has served with Studebaker, Dodge, Maxwell, Chrysler and Copeland products. He has headed Nash since its merger with Kelvinator in 1936.

### New Plymouth Has 50 Changes

If you go over the 1946 Plymouth models, just announced publicly although they have been in a limping sort of production for several months, you should be able to find 34 mechanical changes and 16 appearance changes from the 1942 models. Most readily apparent is a fairly completely redesigned front end, including grille, headlights, bumper and ornaments. Rear fenders also are restyled in conformity with other units of the Chrysler Corp. line; they are larger, sweep back farther, and the wheel cutout is flat across the top.

The Plymouth line includes ten different body types in deluxe and special deluxe types. Engineering changes include a return to plated aluminum pistons, relocation of ignition coil, enclosure of ignition cables in separate compartments, new oil pump, new type spark plugs, new exhaust valve material, new propeller shaft and universal joints with needle bearings, stainless steel beading and moldings in areas subject to accelerated rusting, redesigned interior and exterior hardware and a long list of minor embellishments.

Along with other Chrysler-built models, the Plymouth will feature new and wider safety wheel rims and improved hydraulic brakes with 38-40 per cent increase in effectiveness and 25 per cent less pedal pressure.



*Plymouth 1946 model features complete redesigning of front end, fenders, moldings and bumpers*

# Mass Output Of Low-Cost Houses Starts

*Production begun by new corporation, Shelter Industries Inc. Compact utility unit contributes to low prices*

A NEW corporation to design, manufacture, and distribute completely equipped factory fabricated houses at erected prices ranging from $4997 to $5891 has been announced in New York by Donald Deskey, internationally known industrial and architectural designer.

Known as Shelter Industries Inc., with headquarters at 630 Fifth Ave., New York, the new corporation has started production in its East Coast manufacturing facilities, and volume production, Mr. Deskey said, will make houses available at the rate of 200 a month before the end of this year.

Plans to expand the number of factories identified with the program will enable the company to produce at the rate of more than 26,000 annually during 1947, he added.

The new houses, according to Mr. Deskey, will be practical, comfortable, low-cost, expandable living units, complete even to such items as kitchen ranges, cabinets, refrigerators, lighting fixtures, circulating warm air system, hot water heaters, springs and mattresses, and complete plumbing and wiring equipment. The quoted prices, Mr. Deskey said, include all erection and foundation costs and exclude only the cost of land.

The company will deliver the new houses from key combination manufacturing and distribution centers throughout the country, according to John Sculley Jr., chairman of Shelter Industries and partner in a New York law firm.

The houses are the first factory fabricated ones designed to incorporate a new and revolutionary central utility unit being manufactured by Ingersoll Steel Division of Borg-Warner Corp., Chicago., Mr. Deskey said. The new utility unit which provides in one compact package a gas or oil circulating warm air furnace, gas or electric hot water heater, all plumbing, tub-shower bath combination with all other bathroom fixtures, and complete kitchen equipment, including sink, cabinets, electric refrigerator and gas or electric range, is one of the main factors contributing to the low cost of the houses.

COLORS REVEAL STRAINS: Operator inspects an HF300 diathermy tube in the polariscope at the Brooklyn plant of the Amperex Electronic Corp. Electronic tubes are examined for strains in the glass after heat treating processes are completed. If strains are present, annealing removes them

# BRIEFS . . . .

*Paragraph mentions of developments of interest and significance within the metalworking industry*

**Sutton Tool Co.**, Sturgis, Mich., has appointed Collier Co., Cleveland, as sales and engineering representative for northern Ohio.

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**Davey Compressor Co.**, Kent, O., has appointed the following as sales agents: B & H Construction Equipment Co., West Columbia, S. C.; A. L. Barnum & Son, Burdett, N. Y.; and Burton Equipment Co., New Orleans.

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**Philco Radio & Television Corp.**, subsidiary of Philco Corp., Philadelphia, has changed its name to Philco Products Inc.

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**Sarco Co. Inc.**, New York, maker of heating specialties, regulators, etc., has opened a sales office at 1129 Vermont Ave. N. W., Washington 5.

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**Ward Leonard Electric Co.**, Mt. Vernon, N. Y., has opened a branch office at Industrial Office Bldg., Newark 2, N. J.

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**Richard Bros. Division**, Allied Products Corp., Detroit, has appointed Geo. A. Rieke Co., Chicago, as sales representative for the Chicago area.

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**Lovejoy Tool Co. Inc.**, Springfield, Vt., has appointed Lempco International Inc., Cleveland, as representative for its cutting tools in foreign markets.

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**Oneida Products Corp.**, Canastota, N. Y., has been incorporated and succeeds Canastota Division, Oneida Ltd. It will operate as a subsidiary of Oneida Ltd.

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**United Autographic Register Co.**, Chicago, has changed its name to Uarco Inc. and will spend an estimated $1

million for expansion in the next two years.

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**Simonds Saw & Steel Co.**, Fitchburg, Mass., and subsidiaries have adopted a new trademark for all their products.

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**Sterling Alloys Inc.**, Woburn, Mass., has appointed the following as service representatives: J P. Clark Co., Philadelphia, for eastern Pennsylvania, southern New Jersey, Delaware, Maryland and Virginia; B. G. Constantine, Springfield, Mass., for western Massachusetts, Vermont, northeastern New York and Connecticut; Walz & Krenzer Inc., Rochester, N. Y., for central and western New York; and W. F. Berryman, for eastern Massachusetts, Rhode Island, New Hampshire and Maine.

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**R. G. LeTourneau Inc.**, Peoria, Ill., has completed its domestic sales organization by the appointment of fifty-seven exclusive distributors throughout the country.

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**Research for Industry Inc.**, Cleveland, has developed a nationwide plan to correlate the research needs of small industries and supervised scientific research in technical schools and colleges.

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**Kuhlman Electric Co.**, Bay City, Mich., has changed the name of its New York district office to J. E. Bevan Co. Inc.; office location remains at Graybar Bldg., New York 17.

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**Pan American Alloys Inc.**, New Orleans, has purchased the buildings formerly occupied by National Machine & Foundry Co. at Scottsdale, Pa., and production of aluminum alloy and brass and bronze castings is scheduled to begin there in March.

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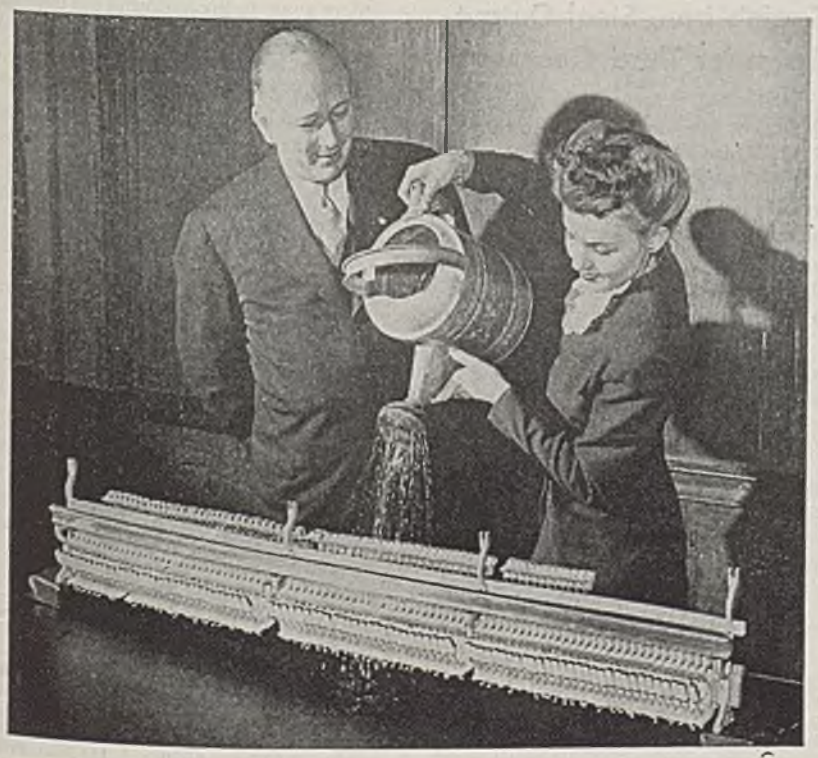
**Pettibone Mulliken Corp.**, Chicago, has acquired control of Beardsley & Piper Co., that city, manufacturer of foundry equipment, which will be operated as a wholly-owned subsidiary.

## Clayton-Sherman Abrasives Plans Plant Enlargement

At a recent banquet, plant executives, production men and the Michigan sales division of Clayton-Sherman Abrasives Co., Detroit, had outlined to them the company's expansion program which will begin in the latter part of 1946.

Plans call for doubling and possibly tripling the company's production of high grade steel shot and grit by enlarging the plant and adding machinery and equipment.



MAGNESIUM ACTION: Magnesium and other moisture-proof materials are used in this piano action to prevent warping and misalignment during damp periods. Manufactured by Permat Products Inc., Rockford, Ill., it is claimed to provide 95 per cent permanent regulation after installation in a piano

# Harvester Co. Plans Center For Research

*New establishment will be devoted to improving manufacturing methods for firm's entire line of products*

A RESEARCH center for improving manufacturing methods is to be established by International Harvester Co., Chicago, for its entire line of products.

The center will be located at 5225 South Western Ave., Chicago, where during the war Foote Bros. Gear & Machine Corp. made aviation parts.

The new Harvester establishment will not be a general research laboratory but rather will be a specialized center for intensive study of improved manufacturing processes. It will not replace the substantial amount of manufacturing research being conducted at individual Harvester plants. Rather, the new center will supplement such plant research, said K. O. Schreiber, vice president in charge of manufacturing.

M. C. Evans, manager of Harvester's manufacturing research and training department, will direct the research activities in the new center. It is expected that the building will be ready during the summer for operations. Approximately 350 employees will be assigned to the new research center which will occupy about 230,000 sq ft of floor space. Key men from Harvester's manufacturing plants over the United States will be called in to direct various phases of the manufacturing research.

### To Contain Eight Laboratories

Eight separate laboratories, all related to specific manufacturing functions, will be operated at the research center. They are: Technical laboratory, including metallurgical, chemical and physical testing divisions; welding, foundry, paint, packaging and product protection, machining, induction heating and heat treating laboratories.

Functioning closely with the laboratories will be a methods improvement section comprising top-ranking Harvester manufacturing engineers. This group will apply findings of research laboratories to manufacturing processes, and also will estimate manufacturing costs of improved processes developed in the research center. The group will maintain close liaison with the various engineering departments working on product design.

# Russia Planning Industry Center In Azerbaidzhan

*Production of pipe and other items proposed 40 kilometers from Baku. Facilities to include seven open hearths*

DEVELOPMENT of a new metallurgical and industrial center in Azerbaidzhan, Soviet Russia, 40 kilometers from Baku, which will produce pipe and other industrial needs, is reported.

When completed, production of the plant is expected to equal 40 per cent of the pipe output of the USSR as of 1940, and will have the first pipe rolling mill in the Azerbaidzhan republic. This is expected to eliminate the former necessity of hauling pipe from more distant localities in the Soviet Union.

Other installations will include seven open-hearth furnaces, a blooming mill of a yearly capacity of 1 million tons of blooms, and a 750 millimeter rolling mill. The first installation in this class, it is claimed, will be a rolling mill to produce from 200,000 to 250,000 tons a month. A machine shop, covering an area of 6000 square meters, is reported nearing readiness.

JAPANESE STRIKE: Nearly 200 strikes for wage increases have occurred in Japan since V-J Day. The Japanese workers have an odd way of conducting a strike. Generally the workers take over, bar management, strive to increase output and raise their own wages. Photo above shows strikers barring management personnel from entering the Tokyo Shibaure Electric Co. NEA photo

## Russia Develops New Type Spot Welding Apparatus

Claims for development of a new type spot welding apparatus are advanced from Russian sources. Advantages are said to be that it permits welding of parts of an auto body, for example, formerly impossible to reach with the hydromatic type of welding equipment previously used.

## Norwegian Farmers Showing Interest in Equipment

Norwegians, faced with obsolete or badly worn farm equipment as a result of the war years, are showing increasing interest in mechanical equipment.

Norwegians, moreover, even in small farm categories, are said to have the buying power to acquire such equipment.

Tractors, plows, mowers, grain drills, grain binders, potato diggers, threshing machines, cultivators, fruit tree sprayers, farm water systems, milking machines, autos and trucks, are listed as among the needs of Norwegian farmers. They are also said to be showing interest in quick-freeze equipment.

## Spain's Iron, Steel Output Down for Third Quarter

Production of iron ore in Spain during the third quarter of 1945 amounted to 335,647 metric tons, making a total of 931,866 tons during the first three quarters of the year, according to *Foreign Commerce Weekly*. These figures compared with an output of 349,500 tons during the third quarter of 1944 and 1,132,500 tons from January through September, 1944.

Pig iron production totaled 120,899 metric tons for the third quarter and 356,632 metric tons from January through September, 1945, compared with 132,050 metric tons and 422,160 metric tons during the corresponding periods of 1944.

A total of 133,177 metric tons of steel was produced in the third quarter of 1945, making a total for the 9-month period of 418,141 metric tons, whereas in 1944 production for the third quarter was 140,620 metric tons and that for the 9-month period, 461,163.

The shortage of electric power was even more acute in Spain during the third quarter than during the earlier part of the year and explains to a large degree the drop in production. Iron mines are reported to have had electricity only 4 hours a day 4 days a week in July, and beginning the latter half of August they received current for only a short period 2 days a week.

## Eire's Imports of Iron and Steel Products Increase

Imports into Eire of all iron and steel products with the exception of pig iron and nails, tacks, rivets and washers increased materially during the first nine months of 1945 over those for the corresponding period of 1944, according to *Foreign Commerce Weekly*. Comparative quantities and values of the imports for January through September, 1944, and 1945 are shown in the following table:

| | | Quantity | | Value | |
|---|---|---|---|---|---|
| | | 1944 | 1945 | 1944 | 1945 |
| Pig iron | tons | 2,221 | 1,426 | £18,885 | £20,647 |
| Bars and rods | tons | 3,282 | 7,676 | 93,724 | 181,754 |
| Structural iron and steel | tons | 357 | 2,568 | 8,145 | 60,077 |
| Plates and sheets | tons | 3,677 | 4,370 | 111,730 | 143,655 |
| Railway material and rails | tons | 658 | 1,433 | 9,775 | 22,935 |
| Wrought iron or steel pipes and gutters | hundredweight | 11,769 | 17,928 | 30,209 | 45,841 |
| Cast iron | hundredweight | 3,189 | 20,218 | 9,565 | 33,898 |
| Wire | hundredweight | 11,729 | 19,646 | 31,535 | 56,812 |
| Bolts, nails, screws | hundredweight | 4.028 | 14,254 | 14,279 | 52,268 |
| Chain and chain cables | hundredweight | 990 | 2,477 | 6,587 | 13,252 |
| Nails, tacks, rivets, washers | hundredweight | 17,301 | 16,896 | 54,735 | 53,154 |

# 904 Dealers Authorized To Handle Sales of Surplus Machine Tools

War Assets Corp. has approved a total of about 904 dealers to solicit and negotiate sales of government-owned surplus machine tools and production equipment. In addition to the firms listed in previous issues of STEEL (Feb. 4, p. 101 and Feb. 25, p. 67), the following have also been approved:

### Alabama

Birmingham: George M. Meriwether, 2226 Third Ave. N.; Ace Machinery Co., 2216 First Ave. S.; Young & Vann Supply Co., 1729 First Ave. N.; W. W. Whorten, 6226 First St. N.; Moore-Handley Hardware Co., 27 S. Twentieth St.; Quinn & Quinn, 1720 Comer Bldg.; S. L. Morrow Engineering Co., 207 N. 21st St.

### Arkansas

Little Rock: Lyons Machinery Co., 904 Broadway; Arkansas Foundry Co., Arkansas Surplus Sales Co., 1640 E. Fifteenth St.; Pine Bluff: Soltz Machinery & Supply Co., 510 E. Third St.

### California

San Francisco: M. Lafleur Mchy. & Salvage, 1203 Fairfax Ave.; Machinery & Equipment Co., 705 Brannan St.; Radway Machine Tool Co., 3166-26th St.; Western Approved Dealers Inc., Russ Bldg.; McNeill-Steinberg Mfg. Co., 330 Ritch St.; Sullivan-Cassimus Co., 651 Folsom St.; Harron, Rickard & McCone Co. of Northern Calif., 2070 Bryant St.; C. A. Kilger Machine Works, 730 Bayshore Blvd.; Jack Martin & Associates, 171 Second St.; Jenison Machinery, 900 Tennessee St.; Coast Equipment Co., 948 Bryant St.; Pacific Scientific Co., 25 Stillman St.; Moore Machinery Co., 1699 Van Ness Ave.; Richard Pierce, 700 Minnesota St.; C. F. Bulotti Mchy. Co., 829 Folsom St.; Victor Equipment Co., 844 Folsom St.; Pacific Equipment Co., 1028 Folsom St.; McCallum & King, 708 Butler Bldg.; Edwin L. Fry, 420 Market St.; Fresno: Hoeffler Machinery & Tools, 2192 Railroad Ave.; Martinez: Bay Specialties Co., 504 Court St.

### Colorado

Pueblo: E. F. Gobatti Engineering, 2301 N. Grand Ave.; Grand Junction: S. & M. Supply Co., Box 247; Denver: Industrial Machinery & Supply Co., 438 Larimer St.; Union Supply Co., 1544 Broadway.

### Connecticut

Stratford: B. & M. Machinery Co. Inc., 275 S. Main St.; Greenwich: Peabody Machinery Co., 23 Church St.; New Haven: Henry S. Iversen Machinery Co., 205 Church St.; State Machinery Co. Inc., 865 Congress Ave.; Hartford: Melville L. Merrill Machinery, 410 Asylum St.; Pratt & Whitney Co., (Division of Niles-Bement-Pond Co.), Charter Oak Blvd.; Wethersfield: Charles E. Lowe Co., Berlin Turnpike; Bridgeport: Austin D. Lucas & Co., 125 Lindley St.

### District of Columbia

Washington: H. C. Parker Co., 917 Southern Bldg.; Howard De Franceaux Associates, 303 Westery Bldg.; Paving Supply & Equipment Co., Tenth & Girard Sts., N. E.; Edmund A. Lucey & Robert S. McDaniel, 1127 Shoreham Bldg.; J. R. Curry Equipment Co., 5435 Connecticut Ave.; T. Oden Mathews & Associates, 1616 I St., N. W.; Washington Trading Co. Inc., Munsey Bldg.; Austin & Berda, 214 Mills Bldg.; Richard P. Henry, Hay-Adams House; John L. Steward Co., 609 F St., N. W.; Redistribution Service Co., 1507 M St., N. W.

### Florida

Jacksonville: J. C. Christopher Co., 146 E. Bay St.; Palmer Machinery Co., 1006 Talleyrand Ave.; Farquhar Machinery Co., 720 W. Bay St.; Oil Dealers Supply Co., 1107 E. Adams St.; General Engineering Co., 339 Park St.

Miami: Liss Equipment, 132 N. W. Twentieth St.; Orlando: Hutchinson Tractor Equipment Co., 1216 W. Central; St. Petersburg: Florida Aviation Corp., 8936 Seventh St.

### Idaho

Boise: Olsen Mfg. Co., 4000 Warm Springs.

### Illinois

Chicago: Marquette Supply Co. Inc., 8220 Burnham Ave.; Jackson-Fotsch Co., 400 W. Madison St.; Industrial Sewing Machine Exchange, 551 W. Van Buren St.; Velick Machinery Co., 1528 Pratt Blvd.; Abbott Tool & Equipment Co., 6755 Merrill Ave.; Barr Machinery Co., 811 W. Lake St.; Robert H. Barron, 32 N. Clinton St.; Central Machinery Co., 2610 Rosemont Ave.; B. L. Saltzman Co., 524 W. Van Buren St.; Wachs-Gregg & Co., 1525 Dayton St.; Inland Machinery Co., 40 S. Clinton St.; H. J. Volz Machinery Co., 631 W. Washington Blvd.

Moline: John J. Normoyle Co., 607 Third Ave.; Moline Tool Co., 102 Twentieth St.; Cicero: Slager Supply Co., 5516 W. Germak Rd.; Rockford: Rockford Machine Tool Co., 2500 Kishwaukee St.

### Indiana

Evansville: Henry Fligeltaub Co., 1022 Division St.; Elkhart: W. J. Niblock Machinery Co., 1002 Johnson St.; Indianapolis: Engineering Sales Co., 621 N. Illinois St.; W. K. Millholland Mchy. Co., 1048 Fairfield Ave.; Sutton-Garten Co., 401 W. Vermont St.; Ft. Wayne: Mayer Machinery Co., 732 Osage St.; Hammond: Standard Equipment & Supply Corp., 534 Michigan St.

### Iowa

Des Moines: Iowa Machinery & Supply Co., 315 Court Ave.

### Maryland

Baltimore: Carey Machinery & Supply Co. Inc., 119 E. Lombard St.; Silver Spring: E. W. Waechter Co.

### Massachusetts

Boston: D. Beal Mchy. Co., 261 Franklin St.; Chandler & Farquhar Co. Inc., 900 Commonwealth Ave.; Manufacturers' Service Associates, 18 Little Bldg.

Everett: C. S. Conant, 99 Swan St.; Lynn: West Tire Co., 212 S. Common St.; Quincy: Surplus Properties Co., 1372 Hancock St.; Somerville: National Metals Co. Inc., off Middlesex Ave.; Springfield: Cohen Bros., 48 Fisk Ave.; Needham: Norfolk Tool & Supply Service, 1054 Great Plain Ave.; East Braintree: Kirkland-Robertson, 130 Allen St.

### Michigan

Dowagiac: Allan R. Trumbull, Route 2; Saginaw: Miles Machinery Co., 926 S. Niagara St.; Muskegon: Lakeshore Machinery & Supply Co., 400 W. Laketon Ave.; Dearborn: Reliable Machine Rebuilders, 8700 Brandt St.; Hazel Park: Monarch Engineering Co., 1491 E. Eight Mile Rd.; Grand Rapids: Standard Machinery Co., 351 Indiana Ave. N. W.; Jackson: H. J. Camden, 825 Hibbard Ave.; Blank & Buxton Machinery Co., 3100 E. Michigan Ave.; Saginaw: Benjamin L. Glattke, 200 Mason Bldg.; O. J. Goodrich, 910 Martha St.; Hazel Park: Al's Machine Repair, 1023 E. Nine Mile Rd.; Foster Machinery Sales Co., 445 W. Milton St.; Grand Rapids: J. C. Miller Co., 52 Mt. Vernon, N. W.; Lester M. Lund, 401 Hoyt, S. E.; Arthur E. Krogstad, 306 Lane Ave., N. W.; Grosse Pointe: Harry Gee, 710 Barrington Rd.; Hamtramck: Fargo Machine & Tool Co., 11363 Lumpkin Ave.

Detroit: Norman I. Ewing, 2544 Gray Ave.; Bryce Machinery Sales, 16126 Coyle; Edwards Industrial Engineering, 806 Fisher Bldg.; Lafayette Machinery Co., 6320 E. Lafayette; English & Miller Machinery Co., 6560 Epworth Blvd.; Condamatic Co., 8620 Gratiot; Robert F. Brown Machinery, 3100 Grand River; Metropolitan Mchy. Co., 1440 Franklin St.; Surplus Machine Tool & Equipment Co., 2020 Elmhurst; N. Silverstine Co., 6532 E. McNichols Rd.; Samuel Mifelow, 431 E. Atwater St.; Brinck & Co., 1906 Dime Bldg.; Albert R. Feltrin, 17202 Teppert Ave.; C. C. Kordenbrock, 9037 Quincy Ave.; J. A. Benoit, 18224 Birchcrest Drive; C & K Screw Co., 25373 W. Eight Mile Rd.; H. R. Krueger & Co. Inc., 1469 E. Grand Blvd.; Lane Supply Co., 11616 Cloverdale; Janoit Sales Co., 18097 Alcoy St.; Matthews Machinery Sales, 2-135 General Motors Bldg.; Mills Machinery Sales, 3126 Grand River; Lampke Surplus Tools, 11607 Linwood Ave.; R. A. Vine, 652 W. Willis Ave.; Ott Machinery Sales Inc., 546 Second Ave.; Benjamin Weiss, 2715 Cortland Ave.; Wm. R. Shields Co., 7-22 General Motors Bldg.; Harry S. Aurietto, 15659 W. McNichols Rd.; Press & Shear Exchange Inc., 3-139 General Motors Bldg.; Harvey Goldman & Co., 9656 French Rd.; McKee-Kenyon & Co., 1627 Fort St. W.; Walker Tool & Mfg. Co., 8737 Kercheval; L. O. Hole, 14764 Dexter Blvd.; Fred W. Gaul, 6316 Theodore St.; Metro Auto Electric Inc., 2650 Poplar Ave.; F. A. Fisher, 241 Glendale; Fors & Savage Inc., 2832 E. Grand Blvd.

### Minnesota

St. Paul: Sales Service Machine Tool Co., 2426 University Ave.; E. E. Taylor, 1641 Dayton Ave.; Newberry Machine Tool Co., 1549 Ashland Ave.

### Nebraska

Lincoln: Ress Machine & Supply Co., 221 S. Ninth St.

### New Jersey

Newark: Tool Specialties Co., 1172 Raymond Blvd.; Ralph Hochman & Co., 52 Edison Place; Herbert Hall Co., 1060 Broad St.; Sun Machinery Co., 36 Van Vechten St.; Asher Machinery Co., 126 S. Fourteenth St.; F. Howarth & Son, 517 Market St.; Perth Amboy: Robert L. Clare, 212 Rector St.; Hillside: Fred Bernau, 57 King St.; Jersey City: Failor Strafer Machinery Co., 22 Pollock Ave.; Elizabeth: Neafie-Goodrich & Son, 272 N. Broad St.; Watchung: Everett J. Jewett; Roselle: Watson-Stillman Co.; Bloomfield: R. V. Osmun Co., 406 Bloomfield Ave.; Trenton: L. Albert & Son, 336 Whitehead Rd.; East Orange: National Machine Tool Bureau, 129 N. Walnut St.; Hackensack: Chamberlain Machine Tool Co., 210 Main St.; North Bergen: American Air Compressor Corp., Dell Ave. & 48th St.

Newark: Bertsch Machinery Co., 972 Broad St.; Clarke's Saw & Machine Works, 146 Lafayette St.; Morristown: J. A. Cunningham Equipment Inc., 266 W. Third St.

### New Mexico

Carlsbad: Hall Machine & Welding Co., 102 Six W. Mermod; Albuquerque: Mountain Equipment Co., Box 1048.

### New York

Brooklyn: Building Needs Inc., 180 Morgan Ave.; Gould Sales Service Co., 45 Plaza St.; Anthony M. Meyerstein Inc., 66 Court St.; Hubert C. Fagan, 111 92nd St.; John T. Hopper, 140 75th St.; Brooklyn Tool Supply Co., 714 Bedford Ave.; Ithaca: Wallace Scrap Iron & Metal Co., 726 W. Clinton St.; Bronx: Castle Contracting Co., 2058 Lacombe Ave.; Jamaica: China Motor Corp., 184 Jamaica Ave.; Long Island City: Craftsweld Equipment Corp., 2626 Jackson Ave.; Lockport: Merritt Engineering & Sales Co. Inc., 120 S. Niagara St.; Buffalo: Galvin Machinery Sales, 1501½ Main St.; John P. Kelly, 224 Tuscarora Rd.; Hartfield-Healy Supply Co. Inc., 190 Main St.; Elmira: LeValley McLeod Kinkaid Co. Inc.; City Island: United Boat Service Corp., 285 Fordham Place; Jamestown: William J. Haehn, 300 Wellman Bldg.; Surplus & Salvage Co. Inc., 109 N. Main St.; New York: Sharp Machinery & Supply Co., 50 Church St.; Syracuse: Syracuse Supply Co., 314 W. Fayette St.; C. H. Briggs Machine Tool Co. Inc., Onondaga Hotel Bldg.; Syracuse Surplus Co. Inc., 107 W. Hiawatha Blvd.; Rochester: Falk Mill Supply Co. Inc., 18 Ward St.; Robert J. Hyder Machinery & Tool Co., 88 Exchange St.; Schenectady: G. & S. Sales Co., 1259 State St.; Albany: Simmons Machine Tool Corp., N. Broadway; Tuckahoe: F. N. Potter, 4 Manchester Rd.

Buffalo: Len-Ray Machinery Co., 3248 Main St.; Ralph Rosen, 723 Genesee Bldg.

# MEN of industry

John May, vice president in charge of sales, American Steel & Wire Co., Cleveland, has been appointed assistant to the president, C. F. Hood, to aid in general commercial and sales policies. Mr. May is succeeded by Harry M. Francis as vice president in charge of sales. Mr. Francis has been assistant vice president. Edwin O. Kumler has been appointed assistant director of industrial relations succeeding Homer J. Weeks, who recently retired from that position after 40 years with the company. Mr. Kumler will direct the safety, casualty and pensions sections of the company's industrial relations department. B. M. Ashbaucher has been appointed manager of the company's electrical, wire rope and construction materials department of the New York sales office. C. W. Meyers has been named assistant manager of the wire rope and construction materials division of the general sales department in Cleveland, succeeding Mr. Ashbaucher.

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J. G. Curry has been appointed assistant sales manager, Structural Products Division, Wickwire Spencer Steel Division, Colorado Fuel & Iron Corp., and will have headquarters in Buffalo.

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J. W. Ward has returned to the sales force of Wright Mfg. Division, American Chain & Cable Co. Inc., Bridgeport, Conn., after 4½ years with the armed forces. He will make his headquarters in Cleveland.

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Gordon L. Edwards has been appointed vice president, United States Steel Corp., New York. Mr. Edwards will continue to serve as treasurer, a position he has held since 1927. He has been associated with the corporation for 47 years.

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Philip F. Shepherd has been named director of sales, Marine Equipment Division, Ellinwood Industries, Los Angeles, and Robert B. Davison, western division sales manager, Farm Equipment Division.

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Clifford R. Hale has been appointed general manager of purchasing and traffic, Rheem Mfg. Co., New York. Mr. Hale formerly was vice president of Continental Industries Inc., New York.

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Harold F. Brandt has been elected president and general manager, Dobbins Mfg. Co., Elkhart, Ind., and North St. Paul, Minn. He succeeds H. E. Brandt, who becomes chairman of the board and treasurer.

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John E. Crain has been transferred from the advertising department, Joseph T. Ryerson & Son Co., to the Advertising Division, Inland Steel Co., Chicago, where he will continue as an assistant to Keith J. Evans, advertising manager of both companies.

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Delamar McWorkman, for many years director and plant manager, Noblitt-Sparks Industries Inc., Columbus, Ind., and who retired from active duty in August, 1945, announces formation of a consulting engineering firm, Willard Engineering Co., Miamisburg, O., to specialize in manufacturing methods.

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Hydraulic Press Mfg. Co., Mount Gilead, O., at its recent annual meeting, re-elected the following to serve as officers: H. A. Toulmin Jr., chairman of the board, president and general manager; P. C. Pocock, executive vice president; R. J. Whiting, vice president in charge of manufacturing; W. C. Batchelor, secretary and treasurer.

—o—

S. B. Knutson has been appointed general superintendent of the Flexsteel Division, Ambridge, Pa., plant, National Electric Products Corp., Pittsburgh. Mr. Knutson succeeds the late Earl B. Douglass, and he will be assistetd by William Jung.

—o—

Newly elected officers of the Carolina Steel & Iron Co., Greensboro, N. C., are: President, J. W. McLennan; vice presidents, W. C. Boren Jr., N. P. Hayes; secretary and treasurer, D. C. McLennan.

—o—

David C. Prince, vice president, general engineering and consulting laboratory, General Electric Co., Schenectady, N. Y., has been awarded the 1945 Lamme medal of the American Institute of Electrical Engineers.

—o—

James F. Brownlee, who served as deputy administrator for price, Office of Price Administration until September, 1945, has been appointed deputy director, Office of Economic Stabilization.

—o—

P. W. Brown, recently retired director of manufacturing, Wright Aeronautical Corp., Paterson, N. J., has been named a member of the board of directors and the executive committee, to serve as director of production, Tyson Bearing Corp., Massillon, O.

—o—

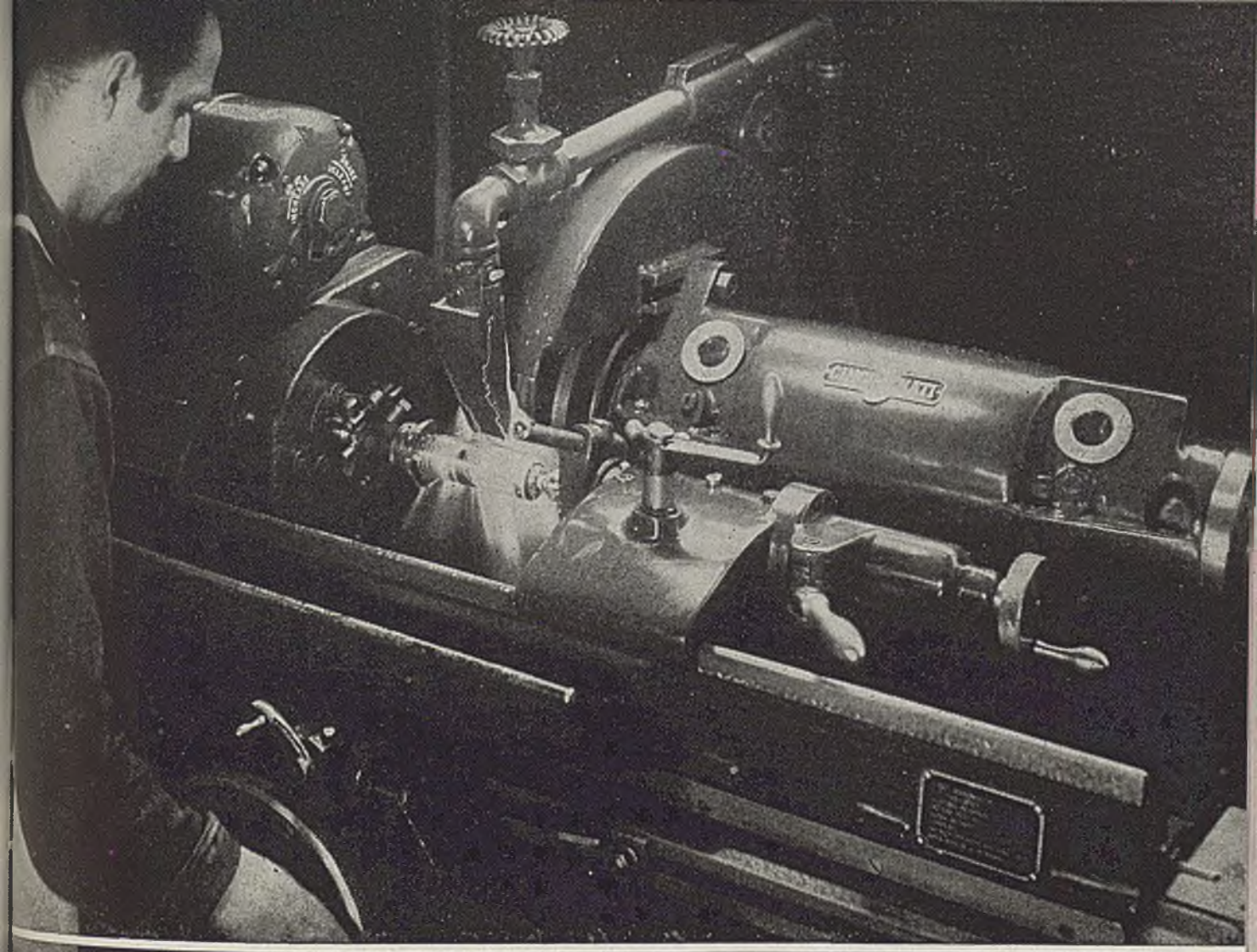
Roscoe M. Smith has been named superintendent of all village plants of Ford Motor Co., Dearborn, Mich., as well as the Hamilton, O., and Green Island, N. Y., plants. Associated with Ford since 1916, he has had extensive production and manufacturing experience, especially in the development and production of electrical equipment.

—o—

Alfred P. Miller, general superintendent, Inland Steel Co., East Chicago, Ind., has been elected chairman, National Open Hearth Steel Committee, American Institute of Mining & Metallurgical Engineers, New York. Mr. Miller succeeds Leo F. Reinartz, manager, Middletown Division, American Rolling Mill Co., who has directed the group for approximately 20 years. E. L. Ramsey,

GORDON L. EDWARDS

DELAMAR McWORKMAN



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Machine: Cincinnati 10 x 36 Plain Hydraulic Grinding-Machine.

Material: Cast Iron.

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Lubricant: 1 part Sunoco to 40 parts Water.

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INDUSTRIAL PRODUCTS

superintendent of steel production, Wisconsin Steel Works, South Chicago, Ill., has been elected vice chairman of the committee and **Frank T. Sisco**, secretary since 1942, was re-elected. New members of the committee's executive board taking office in April are: **John J. Golden**, Gary, Ind., works, Carnegie-Illinois Steel Corp.; **C. R. FonDersmith**, American Rolling Mill Co.; **G. L. Von-Planck**, Columbia Steel Co.; **D. N. Watkins**, *Blast Furnace and Steel Plant*.

—o—

**R. H. Davies** has been appointed consulting engineer in charge of the educational work of the Lincoln Electric Co., Cleveland. For the past 2½ years, Mr. Davies has been the company's representative in Washington.

—o—

**G. H. Gaites**, regional sales supervisor of the Cleveland and Pittsburgh territories, Bristol Co., Waterbury, Conn., has been appointed district manager of the company's New York office. Mr. Gaites has been associated with the Bristol sales organization since 1920.

—o—

**T. C. Fogarty**, formerly general manager, Eastern Division, Continental Can Co., New York, was elected vice president in charge of sales at a recent meeting of the company's board of directors. At the same time, **Paul E. Pearson**, formerly vice president in charge of equipment development and research, was named vice president in charge of operations. **Allan M. Cameron** was promoted from general manager of equipment development and manufacture to Mr. Pearson's former position. **W. H. Funderburg**, formerly vice president in charge of sales, has retired because of ill health.

—o—

**E. H. Welker**, president, Welker Machinery Co. Inc., Detroit, has been elected to the board of directors, General Machinery Corp., Hamilton, O.

—o—

**George R. Stanley**, on terminal leave from the Army Air Forces, recently was appointed to the sales staff of Chandler-Evans Corp., a division of Niles-Bement-Pond Co., West Hartford, Conn.

—o—

**Charles W. Wood** has returned from service with the U. S. Coast Guard and resumed his position as sales representative in the New Orleans territory with the Lukens Steel Co., Coatesville, Pa., and its subsidiaries, By-Products Steel Corp. and Lukenweld Inc.

—o—

**Edward R. Broderick**, until recently designing and development engineer on bombs and bomb fuzes with the U. S. government, has joined the sales engineering force, Advance Pressure Castings Inc., Brooklyn, N. Y. His territory includes New York, Brooklyn and Long Island.

—o—

**A. C. Barioni** is the new general sales manager of Remtico Supplies and Line-a-Time Divisions, Remington Rand Inc., Stamford, Conn., upon his return from duty with the Army Air Forces.

—o—

Harbison-Walker Refractories Co., Pittsburgh, announces the following have been appointed assistant district sales managers: **E. S. Stockslager**, New York; **E. M. Sarraf**, Cleveland; **H. S. Schweinsberg**, Philadelphia; **J. H. Owen**, Chicago.

—o—

**Dave Blount** has rejoined the Magnus Chemical Co., Garwood, N. J., as assistant sales manager.

—o—

**Mason Britton** has been elected president, Metal Cutting Tool Institute, Hartford, Conn. Mr. Britton formerly was vice president, McGraw-Hill Publishing Co.; treasurer, War Advertising Council; director, Tools Division, Office of Production Management; and administrator, Surplus War Property Administration and Surplus Property Board.

—o—

**Arthur J. Olson**, until recently district sales engineer in Chicago, Link-Belt Co., has been appointed district sales manager, Kansas City, Mo., succeeding Max Giffey who has resigned after 40 years' service with the company. **J. Arthur Townsend** and **Leroy C. Rathsam** are district sales engineers in the Kansas City territory.

—o—

**Ray Crowe**, for 27 years with Tennessee Coal, Iron & Railroad Co., Birmingham, leaves the sales promotion department of that company to accept the post of city manager, Mountain Brook, Ala., a suburb of Birmingham.

—o—

**J. P. Henry** has been named eastern zone manager in charge of district engineering offices in Hartford, Conn., Newark, N. J., Philadelphia, and Washington, for Ampco Metal Inc., Milwaukee. **W. F. Taff** has been transferred from the Cincinnati district office to Indianapolis, continuing as field engineer.

—o—

**Samuel S. Brenner** has been appointed manager of the Industrial Supplies Division, George F. Motter's Sons Co., York, Pa., succeeding **George C. Ruby**. Mr. Brenner has been with the company for 10 years, first in a sales capacity and later as manager of purchases.

—o—

**Roger W. Batchelder** has been appointed general purchasing agent, American Brake Shoe Co., New York, replacing **William T. Kelly Jr.**, now president of the company's Kellogg Division. Mr. Batchelder recently was released from active duty with the Army Air Forces.

—o—

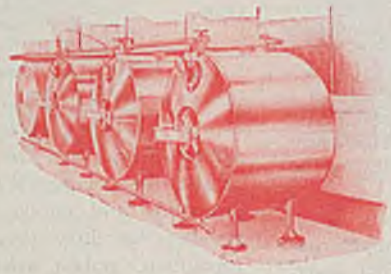
**Raymond A. Durand**, formerly assist-

E. H. WELKER

MASON BRITTON

RAYMOND A. DURAND

# Another way INDUSTRIAL STEELS helps you sell Stainless Steel Equipment



*INDUSTRIAL STEELS* encourages your customers to buy stainless steel equipment, by giving them concrete facts about its advantages. With stainless, textile dyers are assured of a new freedom from causes of snagging or off-colors, paper makers and chemical producers can count on a measurable increase in corrosion resistance . . . food processers and dairies have added assurance of product purity . . . housewives and hotel operators alike know the friendliness and lasting beauty of stainless steel utensils and flatware.

You can profit from INDUSTRIAL STEELS' complete service in stainless. Weekly stock list; complete metallurgical facilities; laboratory analysis; stainless processing including surface hardening, bright annealing, electropolishing, black passivating, etc.; broad knowledge of the problems of your stainless steel equipment prospects;—all are INDUSTRIAL STEELS services available to fabricators of stainless.

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**INDUSTRIAL STEELS, INC.**

255 BENT STREET • CAMBRIDGE 41, MASS.

ant sales manager, Edward Valves Inc., East Chicago, Ind., has been promoted to sales manager.

—o—

**Kenneth K. Boynton** has been elected vice president, International General Electric Co. Inc., New York, and will be in charge of relationships with associated companies in Europe.

—o—

**Robert M. Campbell** has been appointed manager of advertising and sales promotion, J. A. Zurn Mfg. Co., Erie, Pa. **James Glass Jr.** has been promoted to vice president in charge of sales and **John H. Schmid,** to vice president in charge of engineering.

—o—

**Jay M. Holmes** has joined Reynolds Metals Co., Louisville, Ky., as industry manager, Marine Division. Mr. Holmes served as a colonel in the U. S. Armored Forces, being with the Army from 1941 until January, 1946.

—o—

**Benjamin Schwartz,** formerly chief, Scrap Metals Division, Foreign Economic Administration, Washington, has formed the Benjamin Schwartz Co., with offices at 11 West 42nd St., New York. Mr. Schwartz will merchandise scrap iron and steel, nonferrous scrap metals and other secondary raw materials as well as new steel and metal products.

—o—

**J. J. Raskob** has resigned as a member of the board of directors, General Motors Corp., New York, and as a member of its bonus and salary committee. Mr. Raskob had been a director of the corporation since 1915.

—o—

**Sir William Larke** is retiring March 31 as director, British Iron & Steel Federation, London, England. He was appointed director, National Federation of Iron & Steel Manufacturers in 1922 out of which organization has grown the present British Iron & Steel Federation and the British Iron & Steel Research Association.

—o—

**E. L. Stine,** associated with the company for 25 years, has been appointed supervisor of scale service, Scale Division, Fairbanks, Morse & Co., Chicago. **Leonard J. Maguire,** who has been assistant to **George Worthley,** manager, Scale Division, has been promoted to assistant chief engineer of the company's St. Johnsbury, Vt., works.

—o—

**J. E. Niederhauser** has been appointed manager of industrial relations, Continental Can Co., New York, following the resignation of **B. M. Brock.**

—o—

Resistance Welder Manufacturers' Association, at its recent annual meeting held in Detroit, elected the following officers to serve during 1946: President, **H. B. Warren,** executive vice president, Thomson-Gibb Electric Welding Co., Lynn, Mass.; vice president, **G. N. Sieger,** president, S-M-S Corp, Detroit; executive secretary, **George A. Fernley,** Philadelphia; secretary-treasurer, **H. R. Rinehart,** Philadelphia.

—o—

**Earl A. Long,** former assistant director of the Los Alamos atomic bomb laboratory, has been appointed a professor in the University of Chicago's new Institute for the Study of Metals.

—o—

**Ralph S. Lamie,** assistant to the export manager, H. K. Ferguson Co., Cleveland and New York, has been named chemical consultant to the National Resources Commission of the Chinese government.

—o—

**S. R. Christophersen,** who since June, 1943, has served as industrial consultant of technical advisory service and as special assistant to the Cleveland regional director, Smaller War Plants Corp., has been appointed to an executive position with Smaller Business of America Inc., Cleveland, a non-profit organization. **George Bissett Sr.,** president, Bissett Steel Co., Cleveland, is president of the group.

—o—

**William H. Marion** has been appointed by the Progressive Welder Co., Detroit, to be its representative in northern Ohio.

—o—

**Carl Havens** has been appointed assistant to **W. A. Blees,** vice president in charge of sales, Consolidated Vultee Aircraft Corp., San Diego, Calif., to supervise the company's advertising, sales promotion and public relations. Until recently he directed advertising, sales promotion, public relations and plant promotion for Oldsmobile Division, General Motors Corp.

—o—

**Forest L. Line** has been named Pacific Northwest manager of appliance sales for Rheem Mfg. Co., with headquarters at Portland, Oreg.

—o—

**R. F. Jordan,** for the past 13 years sales manager, Sterling Wheelbarrow Co., Milwaukee, has been elected vice president. He is succeeded as sales manager by **C. A. Gehrman,** formerly assistant sales manager.

—o—

**Clifford T. Butler** has been appointed superintendent, Hercules Powder Co.'s dynamite plant at Bessemer, Ala., succeeding **Hugh B. Sanders,** retired.

—o—

**Charles A. Fitz-Gerald Jr.,** who previously served in the office of Chief of Ordnance, Washington, has been made sales engineer, Sloss-Sheffield Steel & Iron Co., Birmingham.

—o—

**Orin P. Walker** has been named man-

SIR WILLIAM LARKE

S. R. CHRISTOPHERSEN

ORIN P. WALKER

HARRY WILSON JR.

*Recently elected first vice president, Jessop Steel Co., Washington, Pa., noted in STEEL, Feb. 11 issue, p. 87.*

IRVING C. BROWN

*Who is sales manager, Industrial Electronics Division, Raytheon Mfg. Co., Waltham, Mass., noted in STEEL, March 4 issue, p. 114.*

LOUIS J. REED

*Who has been appointed assistant chief engineer, Jones & Laughlin Steel Corp., Pittsburgh, noted in STEEL, Feb. 18 issue, p. 84.*

ager of commercial research, Bethlehem Pacific Coast Steel Corp., San Francisco. Mr. Walker formerly was assistant sales manager of Petroleum Equipment International and when this company was acquired by Bethlehem, joined its commercial research staff.

—o—

**Earl H. Lenz**, formerly production manager, Airplane Division, Buffalo, Curtiss-Wright Corp., has been appointed production engineer of the new Buffalo Division, Twin Coach Co.

—o—

**Lt. Col. Frederick D. Hansen**, officer in charge of the Milwaukee regional Army Ordnance office for almost 5 years, has been released from active Army service. Prior to being called to active duty, Colonel Hansen was executive vice president, Perfex Corp., Milwaukee.

—o—

**Ralph W. Conway**, for 15 years associated with Globe-Union Mfg. Co., Milwaukee, has been elected treasurer.

—o—

Sharon Steel Corp., Sharon, Pa., has announced the promotion of the following: **J. D. Neuman** is now assistant to the president and director of purchases; **Glenn R. McQuiston**, purchasing agent; **P. L. Henry**, production manager; **R. E. Cunnick**, general manager of sales for Niles Rolling Mill Co., Niles O., a subsidiary. Also, **Harry M. Genger** has been appointed superintendent of transportation and labor at the Sharon and Farrell works.

—o—

**H. Malcolm Priest** has been appointed manager of the railroad research bureau, United States Steel Corp. subsidiaries.

—o—

**W. K. Sims** has been appointed exclusive sales representative in the New York area for C. B. Hunt & Son Inc., Salem, O., replacing **M. A. Rumely**.

## OBITUARIES...

**Lewis F. Quigg**, 57, executive vice president, Colorado Fuel & Iron Corp., Denver, was fatally injured in an automobile accident Feb. 26. Mr. Quigg joined the Colorado Fuel & Iron Corp. in 1928 as general superintendent of the company's plant at Pueblo, Colo. In October, 1938, he was advanced to vice president in charge of operations, and in October, 1944, was named executive vice president, director, and member of the executive committee.

—o—

**Peer D. Nielsen**, 41, vice president in charge of operations at the steel mill, Fontana, Calif., Kaiser Co. Inc., died recently as a result of injuries sustained in an automobile accident. Mr. Nielsen had been with the Kaiser company since September, 1945.

—o—

**Col. Earl J. W. Ragsdale**, 61, inventor and formerly chief engineer, Railway Division, Edward G. Budd Mfg. Co., Philadelphia, died recently at his home in Norristown, Pa.

—o—

**Nels A. Nelson**, 54, production engineer for the past 5 years with Nordberg Mfg. Co., Milwaukee, died Feb. 26 while on a business trip in St. Louis.

—o—

**Hans A. Amundsen**, 69, works manager for the Wright Aeronautical Corp., Paterson, N. J., from 1933 to 1943, died Feb. 25 at his home in Ridgewood, N. J.

—o—

**Don Murillo Brockway**, 80, founder and former president, Crown Body & Coach Corp., Los Angeles, died recently at his home in that city.

—o—

**Herman A. Everlien**, general sales manager, Mechanical Goods Division, United States Rubber Co., New York, died at his home in that city recently.

—o—

**George A. Fuller**, 58, for 30 years district sales manager in Detroit for Federal Foundry Supply Co., died in Detroit Feb. 26. He was secretary-elect of the Detroit Chapter, American Foundrymen's Association, and a member of the board of directors of that group.

—o—

**Walter H. Metcalf**, 47, contracting engineer for Pittsburgh-Des Moines Steel Co., Pittsburgh, died recently while on a business trip to Helena, Mont.

—o—

**Arthur E. Hedstrom**, 76, president, Hedstrom-Spaulding Inc., Buffalo, died recently at Vero Beach, Fla.

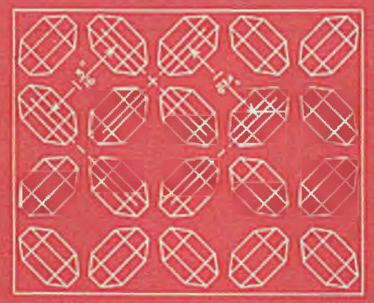
—o—

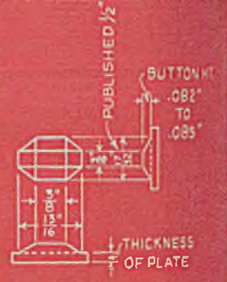
**Fred Baumer**, 50, founder and president, Standby Screw Machine Products Co., Cleveland, died March 4 in Cleveland. He founded the Standby company in 1939.

—o—

**John F. Schulte**, who retired 4 years ago as president, Schulte Brass Mfg. Co., Cincinnati, which he founded in 1923, died at his home in that city recently.

# Lathe for "Indenting"



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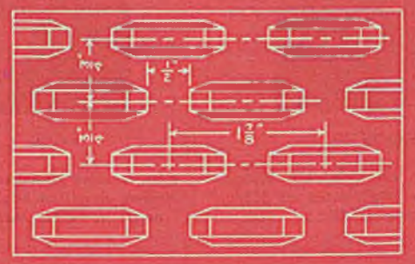


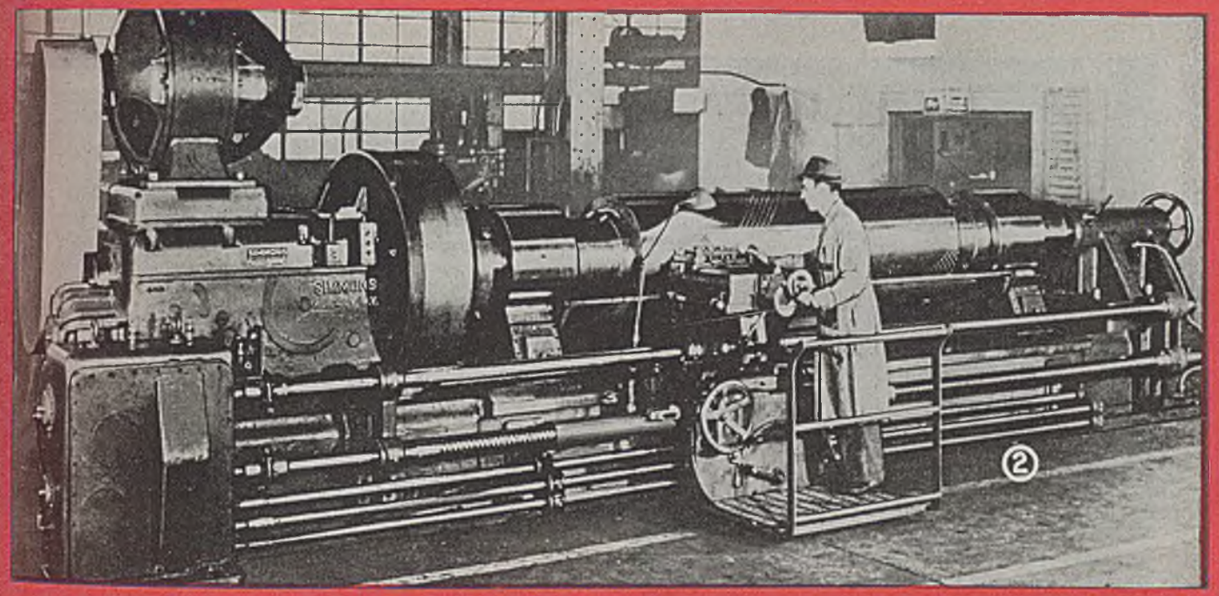

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## . . . floor plate rolls achieves results by ignoring traditions

*Behind every manufactured product—either directly behind it or directly behind the equipment which in turn produces it—stand machine tools. As far as the average user of a product is concerned, these tools remain obscure. Have you ever given thought to the "machine behind the machine" which rolls anti-skid treads on steel floor plates?*

By SAMUEL KOFFSKY
*Chief Engineer*
Simmons Machine Tool Corp.
Albany, N. Y.

IN designing the special purpose machine tool herein described, basic performance requirements were specified by Carnegie-Illinois Steel Corp. for a roll grooving lathe to cut intermittent grooves or "button" forming indentations in alloy steel rolls producing the two types of floor plate shown in Fig. 1, a diagonal pattern "S-300" (upper view) and a parallel pattern "M-41" (lower view).

Principal dimensions of the lathe and roll shown in Fig. 2, are: Body length of roll 100 in., overall length of roll 15 ft 11 in. and maximum roll diameter 27⅜ in., these dimensions in turn determining the size of the lathe approximately 54 in. swing, with bed length of 26 ft.

Three distinct functions must be synchronized for the proper operation of this lathe. These are, rotation of the roll, traverse of the tool carriage and cam-operation of in-and-out movement of tool head. For cutting the diagonal pattern, upper view in Fig. 1, a mechanism has been incorporated to reverse the carriage traverse with respect to roll rotation. In this connection, all clutches and gearing must be entirely free of lost motion in order to make it possible to enter and withdraw the cutting tools in either direction at will.

One of the most intriguing problems was that presented by the circumstance that a roll body originally having diameter of 27⅜ in., eventually is reduced by successive redressings to a minimum diameter of 25⅝ in. before the roll is scrapped. This means that the circumference varies as much as 5½ in. between the maximum, when new, and the minimum, when discarded, hence the number of indentations must be adjusted throughout the life of the roll to maintain the spacing and angular relationship as nearly identical as possible for all plate rolled.

This problem has been solved by introducing a change gear in the feed gearing, ahead of the lead screw and cam shaft power take-off. Thus the cam shaft and lead screw remain in fixed relationship but can be varied with respect to roll rotation.

A second difficulty was introduced by the requirement that the lathe be designed to cut both the diagonal pattern, upper view, Fig. 1 and parallel pattern, lower view, Fig. 1, rolls at will with the least possible amount of lost time. The two types of patterns necessitate changes in the cutting tools, the cam determining the longitudinal profile



*Fig. 1—Two types of steel floor plates with raised "non-skid" buttons, in rolling which Carnegie-Illinois Steel Corp. required a special lathe for machining button indentations in new rolls and for remachining them in redressed rolls*

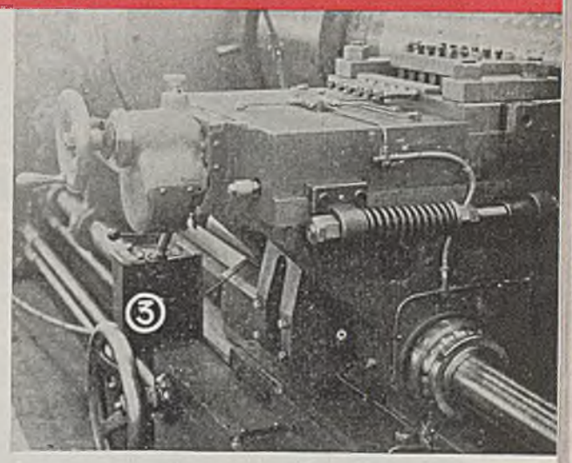
*Fig. 2—Lathe in action on an intermediate cut on a second group of six rows of left-hand spiral button-forming indentations in roll for diagonal-pattern floor plate. Roll is revolving toward the operator but lead screw is in reverse, thus propelling the carriage toward the tailstock. Note that operator "rides the carriage," thus enabling him closely to observe and control progress of work*

*Fig. 3—Close-up of carriage, looking toward headstock, with parallel pattern cuts under way on roll*

*Fig. 4—Replaceable multiple tool holders for mounting on carriage—upper one being for parallel pattern and lower for diagonal pattern indentations*

of the individual button and the change gear employed corresponding to the number of indentations per revolution of roll. The carriage, as may be gathered from Figs. 2 and 3, is designed to take completely replaceable tool holders for both the diagonal pattern shown in lower view, Fig. 4B, and parallel pattern, shown in Fig. 4A. This carriage contains a cam sleeve carrying three equal width units, namely, a cam for diagonal pattern, cam for parallel pattern and split spacing collar. To change cams, it is necessary only to remove the split collar from one end of this assembly, slide the two cams toward the space left by the split collar and replace same on opposite end of sleeve. The third item involved in this setup is the change gear located at the headstock end of the lathe. This is easily accessible and quickly changed when required.

As is obvious from Figs. 2 and 3, virtual heart of this machine is the carriage just mentioned. It contains the



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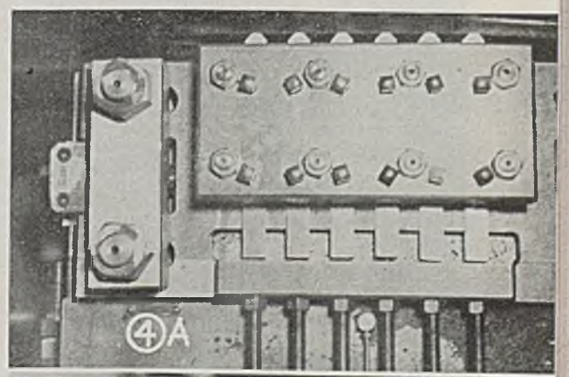

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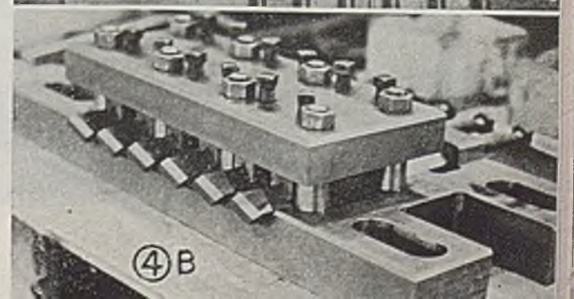

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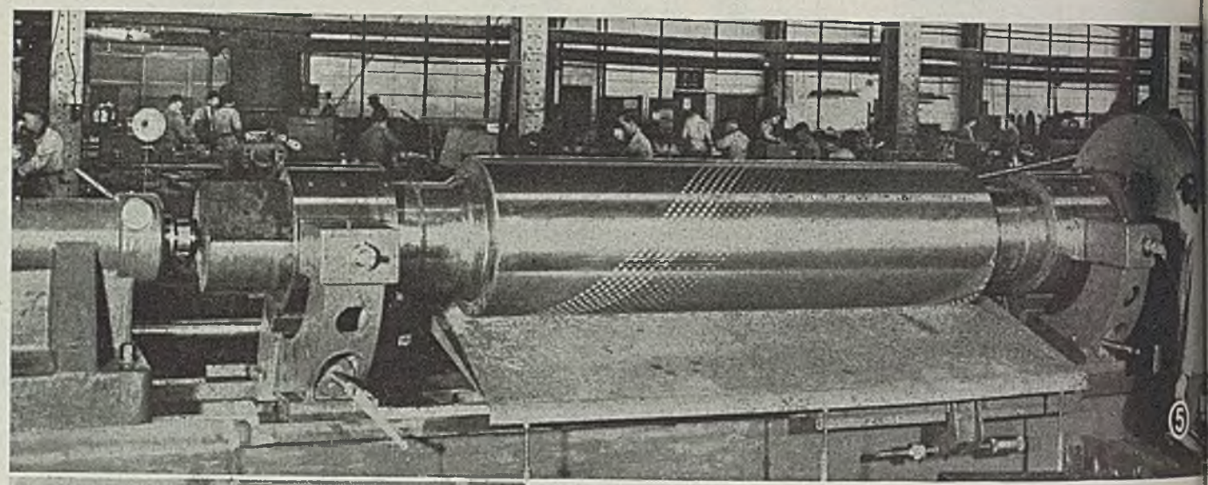
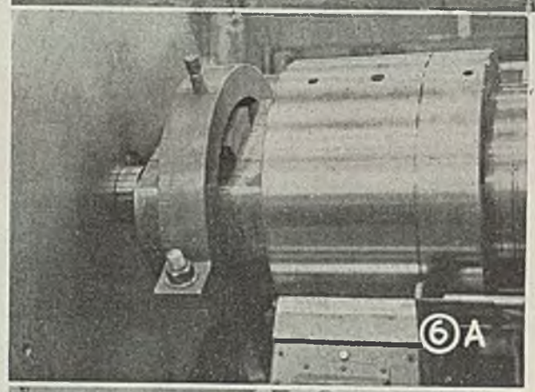
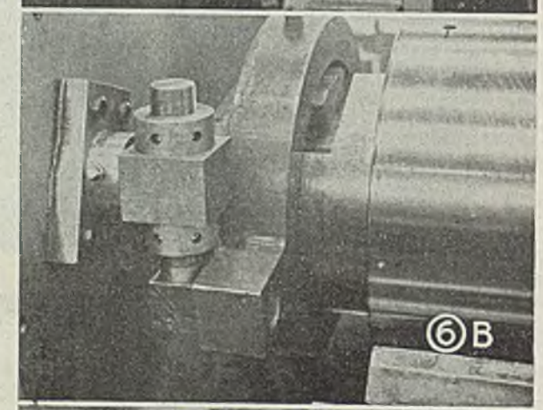






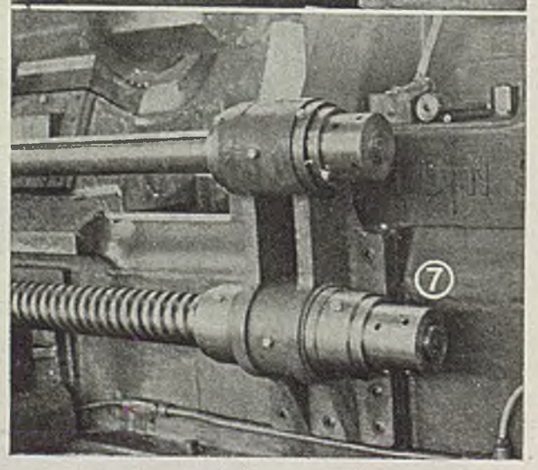


*Fig. 5—Rear view of machine in action cutting left-hand spirals of diagonal pattern. Six rows of indentations to left are down to full depth. Those at right are in initial "skim cut" stage. Note how journal rests (shown in detail in Fig. 9) are utilized*

*Fig. 6—Front and rear views of roll-driving dog which provides exact adjustment for angular relationship between roll and tools to keep exact relationship between rows of cuts*

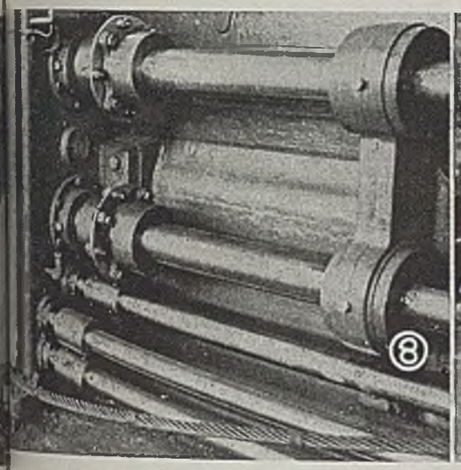
cam mechanism controlling the profiling of the individual indentations, as well as mechanism providing means for traversing the tool head along the bed. All operating controls are centralized on the carriage and as evidenced by Fig. 2 it even provides a moving platform for the ease and convenience of the operator. The cam motion is transferred to the tool slide by means of a rocker arm. This heavy forging, clearly visible in Fig. 3 carries the full cutting loads of the six tools. Location of the pivot shaft for this rocker is such as to provide a two-to-one reducing ratio between cam and tool slide for increased accuracy of motion generated by the cam.

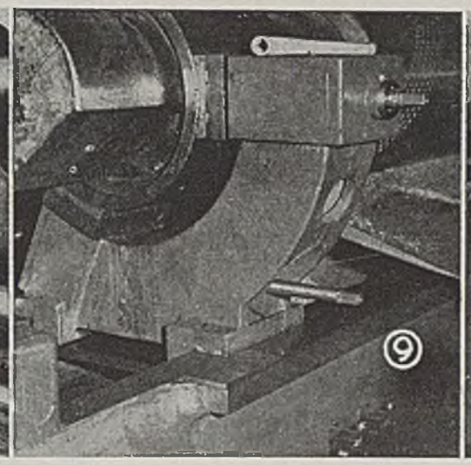
An interesting feature of the rocker assembly is the design of the cam follower roller so as adequately to distribute the heavy working loads. This roller which is 1¼ in. diameter by 3¼ in. face width, is backed up by two 2½ in. diameter rolls. All bearings in the rocker arm are of the precision needle type.

Design of the cam is such that it causes the tool slide to generate a profile equivalent to the sloped ends and flat bottom of each indentation at the same time describing an arc "in the clear" between adjacent buttons. Maximum depth of indentations is 0.100-in. and for adequate clearance total tool travel is 0.250-in. During the grooving operation the cam shaft rotation of course causes the entire tool head to oscillate in and out.

The operator sets the depth of cut by rotating the cross feed screw. The first cut shows up on the roll as a series of rectangular "skim cuts" on the surface. As the depth of cut is increased during repeated passes, the full pattern of the individual indentations becomes apparent. This condition is clearly apparent in Fig. 5 which is a rear view of the machine in action. Two sets of diagonal grooves can be seen, one set of six completed to full depth, the







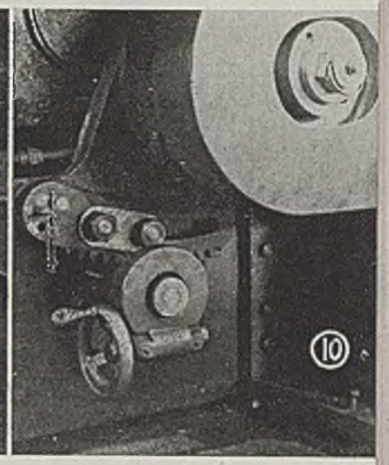


*Fig. 7—Thrust bearing of lead screw. Located at tailstock end of machine, this bearing is designed to resist 30,000-lb thrust load in either direction*

*Fig. 8—At headstock end of machine, a Thomas coupling is used to connect lead screw to feed gear box, thus permitting "float" to compensate for shaft elongation*

*Fig. 9—Close-up of one of the journal rests also shown in Fig. 5. Exact alignment of roll and center is attained by shoes which are adjustable from rear of machine*

*Fig. 10—This heavy duty change gear quadrant, moved by worm, worm wheel and curved rack, located by taper pin and locked by nuts on studs, has to stand up under extremely heavy load*

second set just begun. Note how the journal rests are used.

The tool heads, Fig. 4, contains six tools thus allowing six rows of indentations to be finished at one setting. Because of the extreme hardness of the roll material (scleroscope 55 to 60) slow cutting speeds and light feeds are essential in order to maintain adequate tool life. Cutting speeds are kept to 15 fpm and the feed per pass is approximately 0.005-in. For a maximum depth of 0.100-in. about 20 successive passes are required to complete one set of grooves.

The grooving of a roll with diagonal pattern introduces many factors not encountered during the parallel pattern grooving. Each row of buttons consists of a 45° spiral. For a roll circumference averaging 85 in. the carriage must travel along the bed a like distance for each revolution of the roll. Thus the rolls revolve only slightly more than a single revolution during a complete pass of the carriage from one end of the roll body to the other. To control accurately the stopping of the carriage, adjustable limit switches are employed to stop the carriage automatically at either end. Planer type D.C. motor and control equipment is used for the driving system, speeds thus being adjustable both for slow cutting traverse and for rapid return.

Because the carriage itself takes half the cutting load, the lead screw of this lathe must be exceptionally heavy. Therefore it is 4½ in. in diameter and has a 1¼ in. pitch double acme thread of 2½ in. lead. The thrust bearing for this screw, shown in Fig. 7, is designed to cope with thrust load of 30,000 lb in either direction. All thrust is localized at one end of the lead screw to avoid possible buckling of this screw due to possible elongation caused by frictional heat. The opposite end of the lead screw is connected to the feed gear box at the headstock end of the bed, by means of a Thomas coupling, as shown in Figs. 2 and 8. This coupling is ideal for this connection as it allows for a certain amount of end float due to shaft elongation, is free from backlash and is quickly detachable. The same type coupling is used for connecting the cam shaft to the feed gear box.

To make certain that the tools can be withdrawn, the carriage and roll reversed, and the tools again introduced to pick up successive cuts, exactly according to specifications, it is essential to eliminate backlash at all connections. The driving dog, both sides of which are shown in Fig. 6, merits particular attention. This driving mechanism is completely universal, providing means for adjusting the angular relationship between roll rotation and tool setting.

To adjust accurately the height of roll center, special journal rests are provided, see Figs. 5 and 9. Both shoes are adjustable from the rear of the lathe, the lower shoe being controlled by means of a wedge and screw.

Particular care was taken in the design of the change gear quadrant shown in Fig. 10. Under certain operating conditions, the change gear actually transfers fully two-thirds of the entire power output from the driving motor. A rack and pinion drive in combination with a handwheel-operated worm and gear provides positive and easy movement of this heavy duty quadrant. Each position for any given change gear—of which there are a total of six—is located accurately by a tapered pin. Two heavy studs lock the quadrant in the proper position.

All drive gearing, other than the internal face-plate drive, is of Sykes herringbone type. This includes all the gears in the headstock, the gears in the feed transfer box and the change gears. Forced feed lubrication is provided for the headstock and centralized one-shot lubricating systems are applied to the carriage and feed transfer box. Tool steel hardened and ground ways eliminate possibility of scoring.

An item worthy of mention is the use of a poured babbit nut for the longitudinal carriage traverse. This nut is 20

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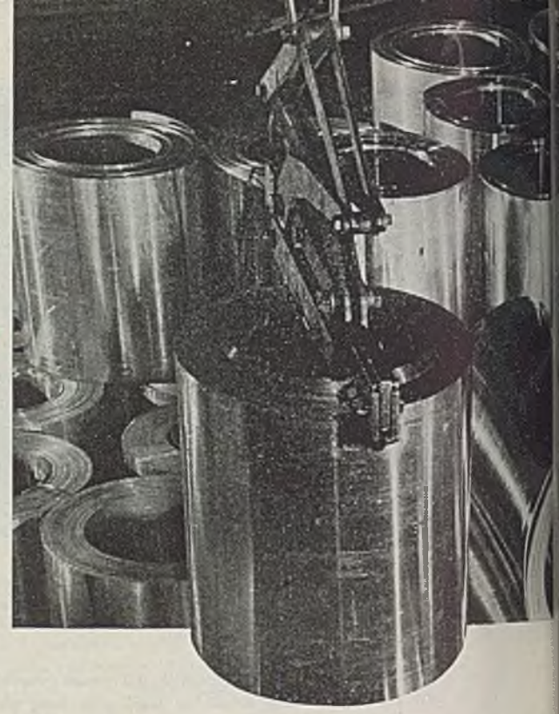
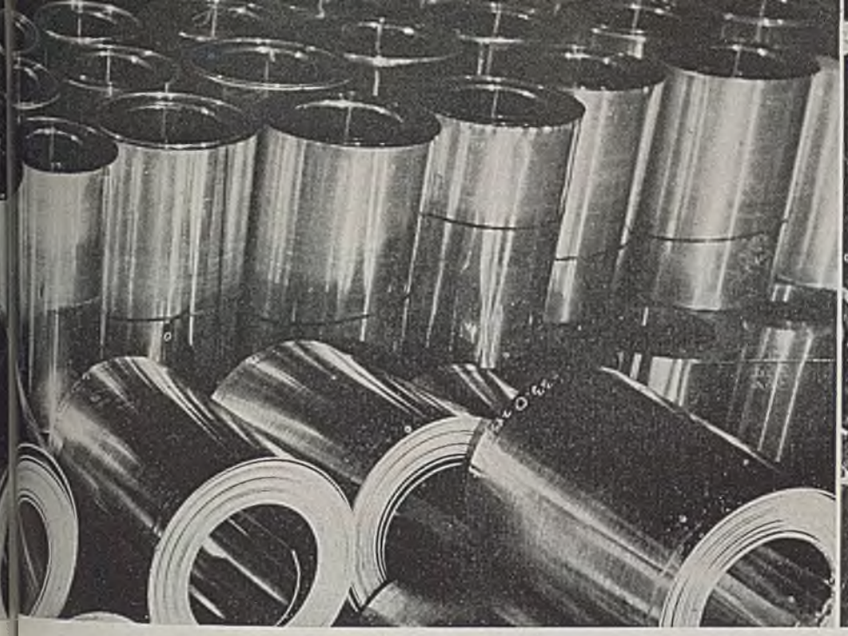
# FABRICATING Aluminum Sheet

By R. P. KYTLE JR.
*Reynolds Metals Co.*
Louisville, Ky.

*Flat sheet method of fabricating aluminum from ingots weighing several hundred pounds yields to faster, more efficient Coil Process—hot rolling into coils and finish rolling to gage in coil form. Other significant changes in procedure summarized*





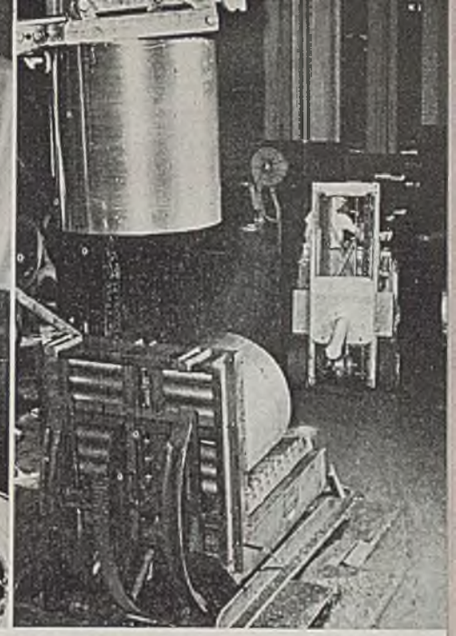


*Fig. 1 (Left)—After ingots of alloyed aluminum pass through hot mills at Reynolds' Listerhill, Ala., plant, the thin metal is edge-trimmed and rolled up on a runout table. Sheet, in coils weighing about 3000 lb each as shown, is ready to be annealed and passed on to cold mills for further thinning*

*Fig. 2 (Right)—Coils from the hot mill are weighed and identified according to alloy. Here an electric truck has just placed coil on an upender. Another coil, having been turned upright, is being lifted by a crane-controlled grab for delivery to another part of the plant*

THE fabrication or manufacture of aluminum sheet is concerned with working the cast structure of the ingot and transforming it into the wrought structure of the finished sheet.

The ingot cast structure consists of grains, the diameters of which are the same in all directions and some columnar-shaped ones. The columnar grains occur where the solidification rate is greater in one direction than another, such as casting against a cold wall of an ingot mold. Upon subjecting the ingot to the rolling operations, the cast structure is disturbed and the applied stresses permanently deform the ingot. After rolling, the grains are flattened and elongated.

Rolling below the annealing or recrystallization temperature is called cold rolling and the change in grain shape is permanent. When rolling occurs above the annealing temperature it is known as hot rolling. Annealing cold worked metal recrystallizes the deformed grains into equiaxed shape grains. While hot working distorts the grain, it is usually at such a temperature that recrystallization takes place. The result produces a normal structure with little hardness change. The hot working does result in some grain refinement and recrystallization produces grains of smaller size than the large as-cast grains.

Metal is more plastic when hot and can be reduced when hot with less energy than while cold. Greater reductions can be taken on hot metal, as hardening does not result to any great extent. Hot rolling is performed primarily to break down the cast structure as a preliminary step to cold rolling.

The war brought about the rapid development of new equipment and fabricating procedures for accomplishing the transformation of the cast structure into wrought sheet. It is to be expected that many of these innovations in the process of fabrication will be improved upon and enlarged, now that the postwar era has begun. For example, it was customary prior to the war to roll all flat sheet in what was referred to as the Flat-Sheet Method from ingots weighing several hundred pounds. This consisted of hot rolling into slabs, shearing the slabs into predetermined lengths and finishing on 2-high train mills. The war expedited the manufacture of sheet by the Coil Process, which consists of hot rolling ingots weighing several tons into coils and finish rolling to gage in coil form with subsequent shearing of the finish gage coil into flat lengths. It is to be expected that practically all sheet will be fabricated by the Coil Process from now on.

**Hot Rolling Procedures:** Ingots are first given a heating operation called preheating or homogenizing before hot rolling. Preheating serves two purposes—it relieves the stresses set up in casting, and tends to dissolve and diffuse the alloying constituents throughout the bulk of the ingot. This is necessary to decrease the brittleness of the metal, since segregation of the alloying constituents as found in the as-cast ingot causes the ingot to be brittle and may present difficulties in rolling. The solution and diffusion of these constituents also aids in meeting the desired properties in the finished sheet.

The sequence of operations performed on the ingot is as follows: (1) The preheating operation and (2) the surface is machined from the ingot. (The latter operation is called "scalping" and is accomplished on a large, specially adapted milling machine, by which approximately ¼-in. is machined off each face.) (3) The scalped ingot is returned to furnaces where it is *reheated* to the hot rolling temperature. (4) The reheated slab is rolled to hot strip and coiled.

In hot rolling the slab prior to coiling, it is possible to control the width of the strip by cross rolling the slab. Here there are essentially only two changes in dimension: The material being rolled is elongated in the direction of rolling, and decreased in thickness. The amount of spread in width is so small as to be generally neglected. Consequently, if strip is to be rolled to a wider width than the width of the slab, this must be done by cross rolling the slab before it is reduced to its final thickness.

The opening between the work rolls is controlled by a high-speed electric motor which operates the elevating screw. The reduction which may be taken by passing metal through the rolls is governed by the distance between the rolls, the speed at which the rolls are driven, the lubricant that is used and the surface of the rolls. In rolling the strong aluminum alloys, those alloys which are made by the addition of copper, magnesium, silicon and manganese to aluminum, hot rolling can only be accomplished in a very narrow temperature range; i.e., the metal is both hot and cold short. If the metal is heated to too high a temperature, the inter-metallic compounds formed by the alloying metals and the aluminum will melt or break down and the metal will crack open. If the metal is too cold, the reductions taken in hot rolling are too severe and the strength of the metal is exceeded and fractures will occur across the grains of the alloy, or we will have transcrystalline fractures. Close temperature control is less critical on 3S and 2S (commercially pure aluminum).

**Hot Rolling Mills:** The types of mills used in hot rolling aluminum alloys have shown an interesting development over the past 30 years. First type of mill used was the conventional single stand, 2-high single direction mill. Small ingots were used and these were passed through the mill and then returned over the top. This type of mill was necessarily slow due to the fact the ingot had to be returned to the entry side after each pass.

The second type of mill employed represented considerable improvement over the single stand in that it made possible rolling in both directions. This type of mill is known as the double-duo mill. The mill itself is actually a combination of two 2-high mills. The hot ingot enters between the rolls of the first 2-high and comes out on a table which is then raised mechanically to a higher level at which the second 2-high mill is situated, turning in the opposite direction.

With the need for greater screw pressures in reducing stronger alloys, the 3-high mill was employed. The center roll, which is normally smaller in diameter than the two outer rolls, acts as a work roll on both the forward and reverse rolling operations. The top work roll turns in the opposite direction from the bottom work roll, so that the ingot may pass between the bottom and middle roll and be returned between the top and the middle roll.

The fourth type of mill used for hot rolling was the 2-high reversing mill. The only difference between this mill and the 2-high unidirectional mill is that it is so geared that the rolls may be turned in either direction, thus making it possible to pass the ingot back and forth between the same set of rolls.

The fifth and most recent type of mill developed for

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# Metal Finishing with INFRA-RED HEAT

*Ovens incorporated in The White Motor Company's revamped Truck Cab Assembly line can dry prime and finish coats in 10 minutes each, saving both time and floor space. Finish on smaller parts is dried in ovens suspended from ceiling*

By JOHN PARINA, JR.
*Assistant Editor, STEEL*

APPLICATION of infra-red radiation in baking the paint finish on completed truck cab bodies at The White Motor Company, Cleveland, has achieved very substantial reductions in drying time, more thorough and even drying of the finish and a considerable saving in floor space. Convection type ovens previously were employed.

With the new ovens, manufactured and installed by the Fostoria Pressed Steel Corp., Fostoria, O., prime and finish coats each may be dried in about 10 min and the bodies are ready for assembly of instruments and other parts. Fenders, hoods, radiator shells and grills and other parts are finished by the system in ceiling-type ovens.

Infra-red heat rays occur in the spectrum just beyond the visible, at the opposite end from ultra-violet radiations. This energy is transformed into sensible heat whenever an opaque (at that frequency) body intercepts the path of the rays, and the transformation takes place at the point of interception. This creation of heat on contact accounts for the rapidity with which paint and lacquer finishes can be dried.

Infra-red energy is generated commercially by means of special tungsten or carbon filament lamps operating at relatively low color temperatures as compared to illuminating lamps. Their incandescent filaments produce rays which peak at wave lengths between 11,000 and 14,000 Angstrom units, and it is these shorter or near infra-red rays (those closest to the visible rays) which are found most efficient.

Approximately 8 years ago a large manufacturer of automobiles turned to this method of heating to speed the production of the paint finish lines in his plant. At that time the radiant heat generated by infra-red lamps was directed by ordinary automobile lamp reflectors. Results from the application were so encouraging as to warrant further study of the method as a means for large scale industrial drying. One of the first steps taken to increase the efficiency of infra-red equipment was to find a reflecting surface which would propagate to the greatest extent the radiant energy.

Research and subsequent study of equipment in actual service led to the reflector which is being used in present day installations The resulting reflector incorporates a steel shell, to give the reflector the necessary strength to withstand the rigors of industrial service, and a gold plated reflecting surface.

Many metal surfaces have been experimented with to determine their suitability for this purpose; two have been found to be highly efficient in their reflectivity of infra-red. These two are gold and specular anodized aluminum. Of these, it has been determined, theoretically at least, that the ideal surface for reflecting radiant heat is gold which is rated at approximately 98 per cent reflectance efficiency. In the Fostoria equipment, the gold is plated over nickel which in turn is plated on copper and the copper on steel.

Additional advantage of using gold for reflecting surfaces lies in its ability to withstand the effects of corrosive atmospheres, and may be maintained at original efficiency by occasional cleaning. Consequently, the reflectors need not be glass enclosed. Lamps and reflectors of a section assembly are shown in Fig. 5. These sections are the basic components of the oven's heating zone.

Two drying ovens are employed in White's cab fin-

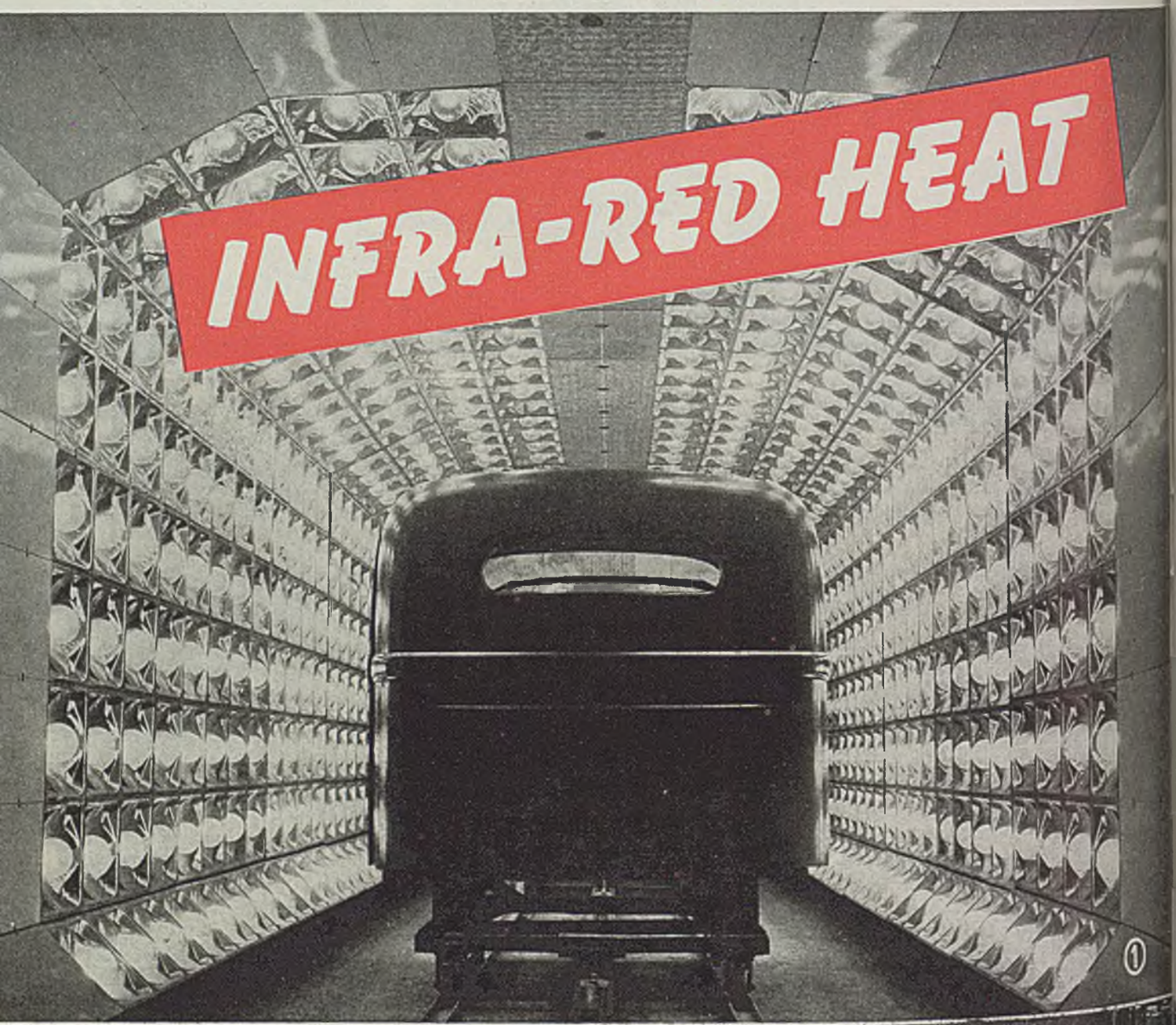

*Fig. 1—With this infra-red radiant-heat oven, White Motor Co. is drying the finish on truck cabs in about 10 min, or a total of 20 min for prime and finish coats. Ovens are built up from the standard sections shown in Fig. 5*

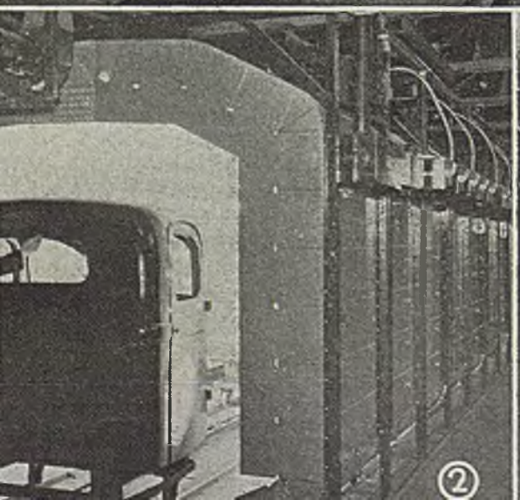

*Fig. 2—Exterior oven view showing how wiring is largely concealed in channel sections. Fumes are removed by end-mounted 1200 cfm exhaust fans*

*Fig. 3—Drying oven for finish coat is located at left rear; spray booth for prime coat at center. Oven for the prime and spray booth for finish coats not shown. Bodies are ready for attaching parts and instruments*

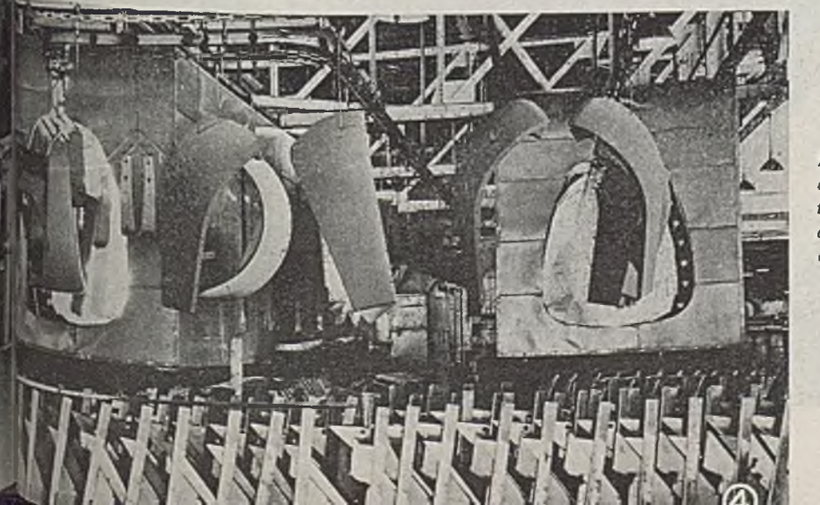

*Fig. 4—Ceiling suspended type ovens showing clearance beneath them which can be used for storage of finished parts. Fenders are carried by tramrail conveyor through the ovens*

ishing line. One is used for drying the primer coat and the other the finish coat. The bodies, stripped of all equipment but the doors and hinges, are placed on a floor-type chain conveyor which may be seen in Fig. 1. Units are spaced 4 ft apart. The bodies are brought into the first spray booth where the base coat is applied, move through the first infra-red drying oven and into the second spray booth where the final coat is applied, then into the second oven and onto the final cab assembly line where windows, windshields, door handles, etc., are affixed. More than 100 cab bodies are completed in an 8 hr work day with the drying cycle used in the present installation.

Working temperatures used at present are 270°F for drying the primer, and 225°F for baking the finish. These temperatures are obtained, respectively, by 250 w side lamps, 375 w bottom lamps; and, 125 w side lamps, 250 w bottom lamps. Higher wattage lamps may be installed in these ovens if the job calls for higher temperatures. Lamps of 375 and 500 w may be used in the system without endangering sockets and wiring.

It is interesting to note that recent tests with infra-red equipment have shown that it is possible to obtain 70 Btu per sq in. per hr. With this type of heat intensity, a very satisfactory finish has been baked on 14 gage parts in as little as 3½ min and a high gloss japan finish has been baked on both sides of a 26 gage sheet in 30 sec.

Both ovens are operated on a 440 v circuit and each half of an oven section is controlled by an individual switch and fuse which carry a maximum load of about 40 amps. However, switches may be arranged to control the entire system or any section or any row of lamps. A total of 528 lamps is used in the 264 in. long heating zone of each oven.

Design of the oven contour requires careful consideration of a number of factors among which are space limitations, physical dimensions of the work, and temperature requirements of the process. Although air temperature has no effect on the original heat transfer, it must be considered because of its influence on heat losses of the work by convection. If the air temperature is less than the work temperature, circulation of air must be held to a minimum to reduce the heat losses from the material being radiated yet must be sufficient to remove the vapors resulting from the processing operation. For this reason, ovens are made along tunnel design and, in this par-

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*Fig. 5—Typical section unit showing arrangement of lamps and reflectors. Shallow reflectors are used to permit the largest possible quantity of direct radiation to reach the work*

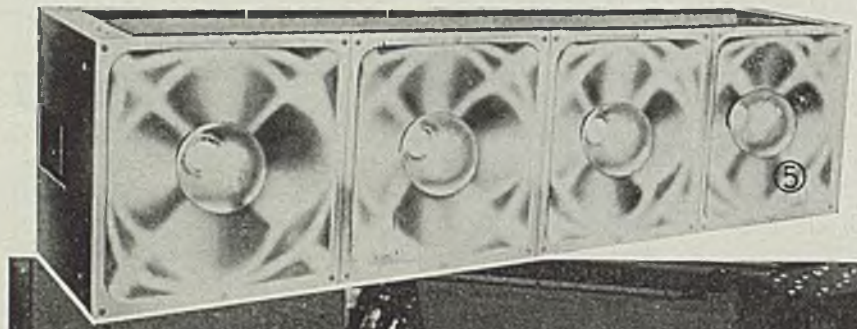
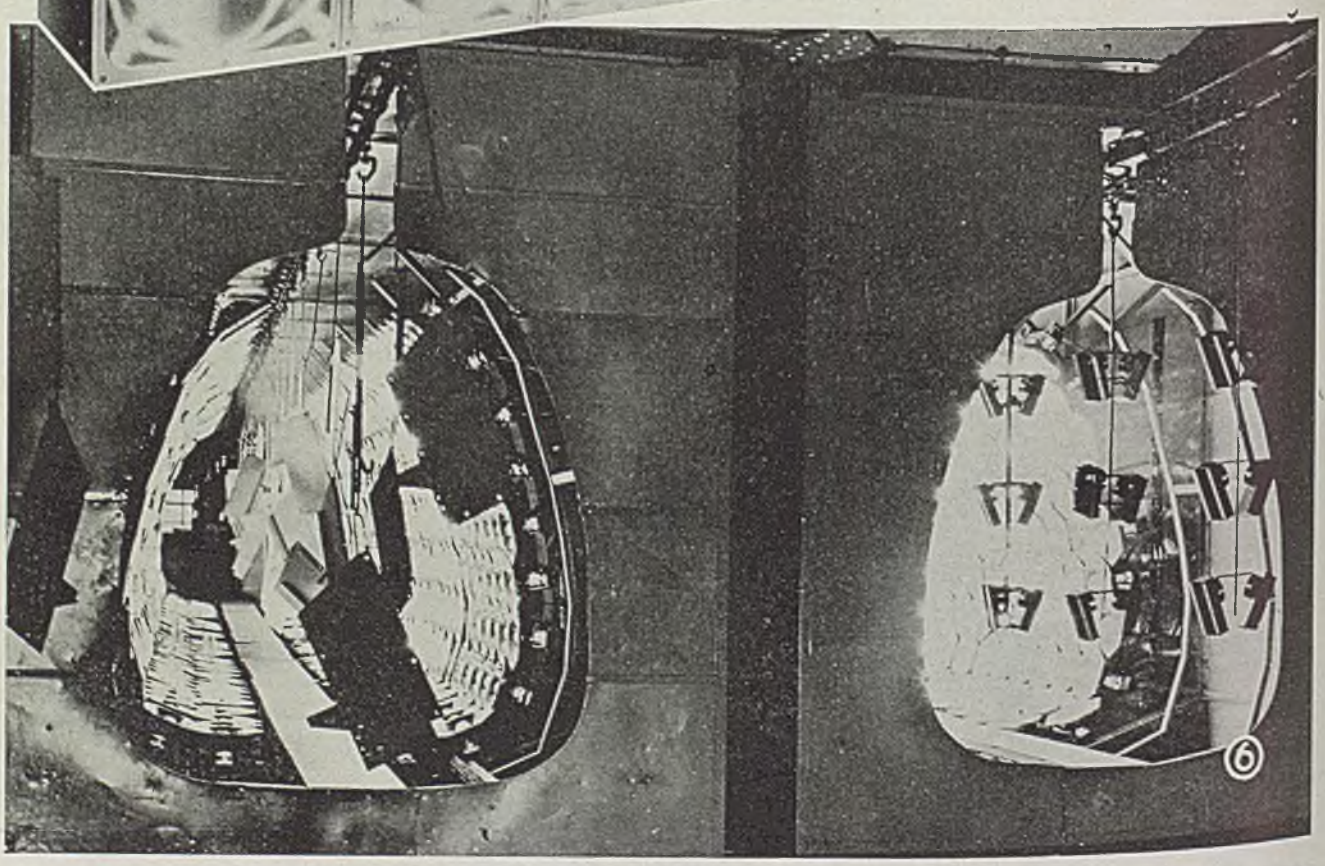



*Fig. 6—Another installation of ceiling suspended ovens. Parts pass through oven at right and return through second oven at left. A wide variety of sizes are handled*



# Engineering NEWS

## Leaded Steels

J. W. Halley, metallurgist, Inland Steel Co., Chicago, recently told an ASM Mahoning Valley district audience about British steel producers who have added up to 0.40 per cent sulphur with 0.50 lead to make steels which they claim are comparable to leaded brasses in machinability. Mr. Halley has obtained 0.80 per cent lead in suspension in steel in an induction-processed heat, but the amount in a commercial heat varies between 0.15 and 0.25 per cent.

## Lubricates Jet Engines

Mistlike spray consisting of 95 per cent chilled compressed air and 5 per cent oil is used to lubricate jet-propulsion engines. Spray is directed on ball bearings at either end of the engine on which the single longitudinal axle revolves, the air cooling the metal and the oil protecting it from foreign matter and rust.

## Half-Car Unit Loads

As an experiment, one company recently shipped a carload of steel lockers, using the half-car unit load principle. With the use of steel bands, each half-car unit was made into an individual mass unit, free to shift within the car under impact. No wood or paper containers were used. Each locker was padded on the edges with 6-in. excelsior pads. Protective wooden gates were positioned at each load end.

## Canned Hydrogen

Canned hydrogen, first used during the war when heavy hydrogen cylinders could not be transported over difficult terrain, has found its way to the stockrooms of civilian laboratories. Canned hydrogen charges, giving 6 to 24 cu ft of gas, originally were developed for inflation of meteorological balloons by Metal Hydrides Inc., Beverly, Mass.

Hydrogen is generated by punching a few holes in the top of the can containing the calcium hydride and then submerging can and contents in water; gas can be collected in a rubber envelope as released. Rubber balloon envelope acts as a simple gasometer to supply hydrogen at sufficient pressure and at any desired rate.

## Low-Temperature Study

American Society for Testing Materials, Philadelphia, has prepared a report in two volumes on "Behavior of Ferritic Steels at Low Temperature." Complete report, prepared by Dr. H. W. Gillett, Battelle Memorial Institute, and Francis T. McGuire, University of Kentucky, is available at $4 per copy.

## Ultra-Speed Camera

Camera which uses a very high speed, high intensity, self-contained light source has been developed by the Army Pictorial Service for the Surgeon General's Office. It is said to be as simple to operate as a box camera, and enables anyone to take color or black-and-white still pictures of the fastest action, indoors at distances from 6 in. to 12 ft.

Light source consists of a coiled circular quart vapor discharge tube, and camera uses 35 mm film. Flash of about 1/25,000 sec duration, provided by the tube, designed by General Electric Co., is too brief to harm the eye.

## Pool Engineering Talents

Engineering staffs of the member companies of Dresser Industries, Inc., Cleveland, have been strengthened and steps are being taken whereby the engineering skill and experience of each company may be applied, where practicable, to the problems of other member companies.

This pooling of engineering facilities also is being extended to the field of customers relations. As an example, there is currently being established in Cleveland a separate sales and service office to be operated as a division of the Stacey Bros. Gas Construction Co. This division is prepared to offer a service, including both the designing and building of facilities for the gas industry, which is reported to have been unavailable up to this time.

In carrying through this program, over half of the other Dresser member companies will be called upon for services and products. A newly created department in Cleveland now is at work developing new and additional markets for the products of Dresser member companies in major industrial centers.

## Metal Disintegrator

A metal disintegrator which operates on the electrical "sputtering" principle is said to remove broken taps and drills from work in progress rapidly and safely without injuring metal of the workpiece, regardless of hardness. Drafto Corp., Cochranton, Pa., the maker, says it bores through hardened high-speed steel at rate of about 1/16 ipm and will drill holes, round or practically any shape, through tungsten carbide, Stellite, and other hard metallic materials.

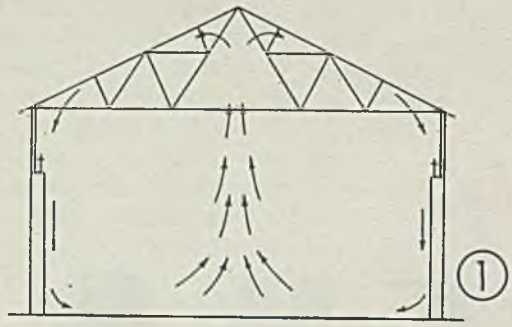
## Laminated Abrasive Disk

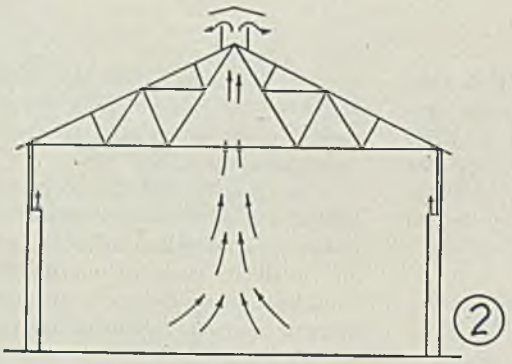
Departing from the conventional form of a single layer of abrasive particles on cloth or paper usually followed in manufacture of abrasive disks, one maker has produced a laminated disk for portable grinding applications reputed to have an extended range.

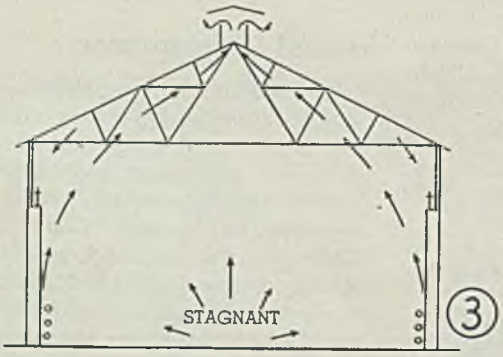
A homogeneous flexible mass of considerable strength is produced by curing together three layers of materials— a bonded cutting layer, a cloth layer, and a several-ply fiber disk. A resilient rubber compound is used to bond the abrasive particles into a layer of grit ⅛-in. thick or more, then the three layers are cemented together. The mutiple-ply construction is said to increase durability 10 to 15 times, provided disks are run at speeds not exceeding 8500 fpm. New York Grinding Wheel Corp., Brooklyn N. Y., says simultaneous roughing and finishing operations using a single disk have been reported.

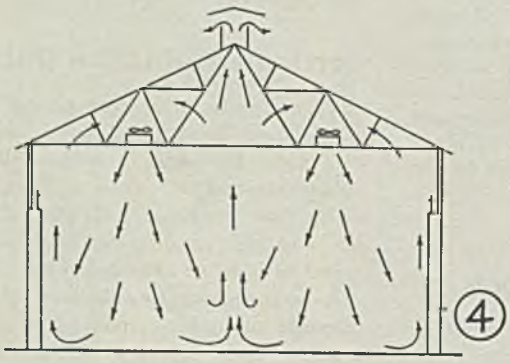
# Mill Building ventilation

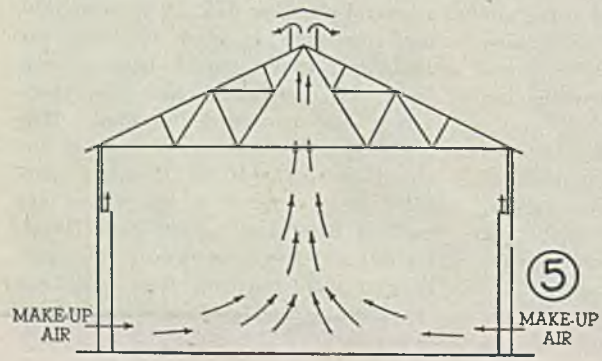
*Preheating fresh air for mill building ventilation, introduced in STEEL, Oct. 30, 1944, is a subject of growing interest for engineers and others charged with responsibility for creating healthful working conditions. Absolute control of "tempered" air distribution relieved the particularly difficult problem of fume-laden air described*

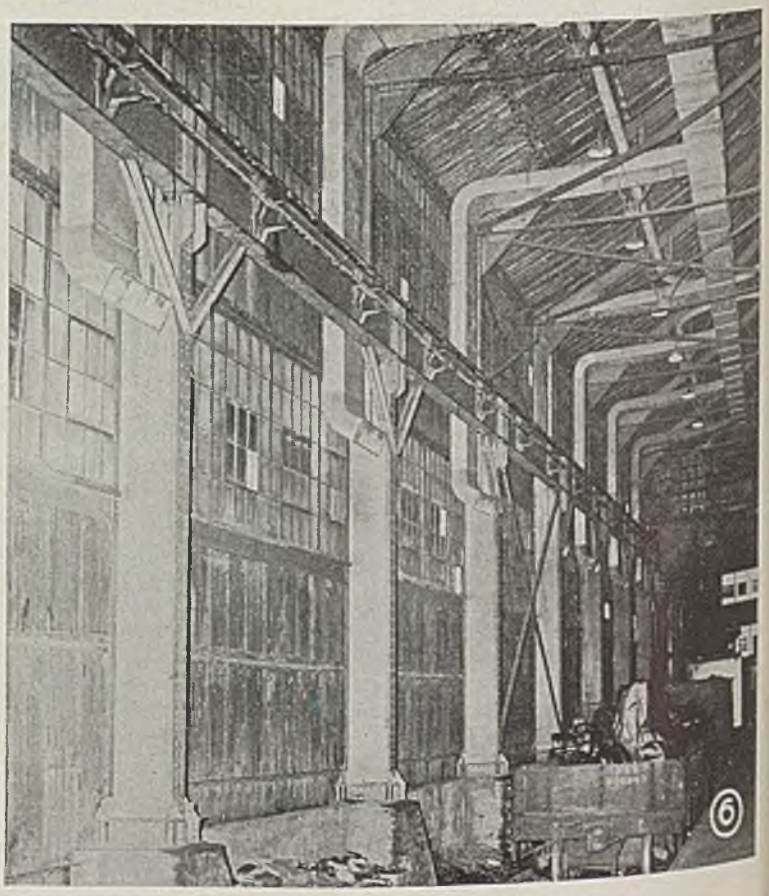


REMOVAL of dust and fumes from mill buildings by ventilation is a problem that promises to require the attention of management for some time to come. Not only is there growing pressure from the various governmental industrial hygiene agencies and labor organizations for more healthful working conditions, but also an increasing realization that the inefficiency of workmen under conditions of poor ventilation is uneconomical.

By DAVE HENDERSON
*Sales Engineer, Heater Department*
Dravo Corp.
Pittsburgh

Ventilating large structures naturally requires the replacement of each cubic foot of air vented, and in winter, the replacement air should first be heated, or tempered, before it is released for circulation. A successful method for conditioning what was the 8-in. shell fabrication building at Weirton Steel Co., Weirton, W. Va., by using excess high-pressure steam that was easily available, offered an economical way of providing makeup air at proper temperatures.

Operations in this building produced fume and smoke conditions similar to those encountered in a number of steel processing operations. The shell fabrication building, therefore, although not a normal part of a steel mill, can be considered as a full scale test model for ventilation of other more conventional steel mill buildings.

The building under consideration housed continuous production lines for the forging, machining, and heat treating of shell casings. Efficient usage of the available floor space made it necessary to conduct machining operations with relatively high concentration of personnel close to smoke and fume-producing forging and heat-treating equipment. Coke oven by-product gas was used to fire various heating and annealing furnaces, further contaminating the atmosphere.

Ample steam at 250 psi gage pressure and 500° F total temperature was available for tempering the ventilation air during winter operation. Since this steam condition exceeds the limitations of standard, lightweight, nonferrous, finned heating surface, more rugged equipment had to be developed than is normally used in steam heating practice.

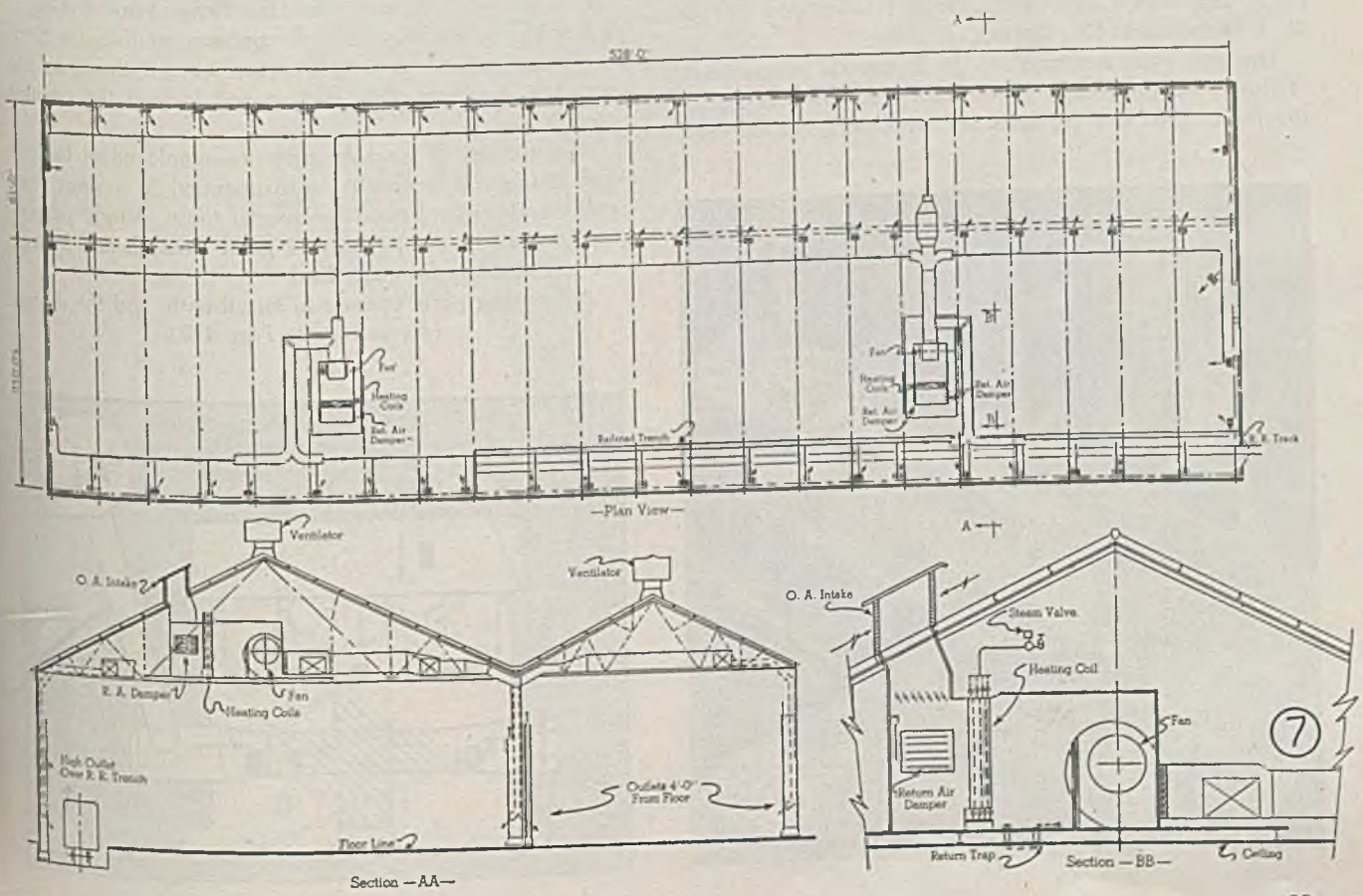
In considering the theory of ventilation of such a building, we first attempted to predict the normal air movement within the building before any mechanical or forced movement of air was attempted. Referring to Fig. 1, in which is sketched a cross section of a building of the type under discussion—heat producing processes, machinery and people near the floor level tend to warm the air, causing it to rise toward the roof. The exposed roof cools the rising air currents so that they become heavy and tend to

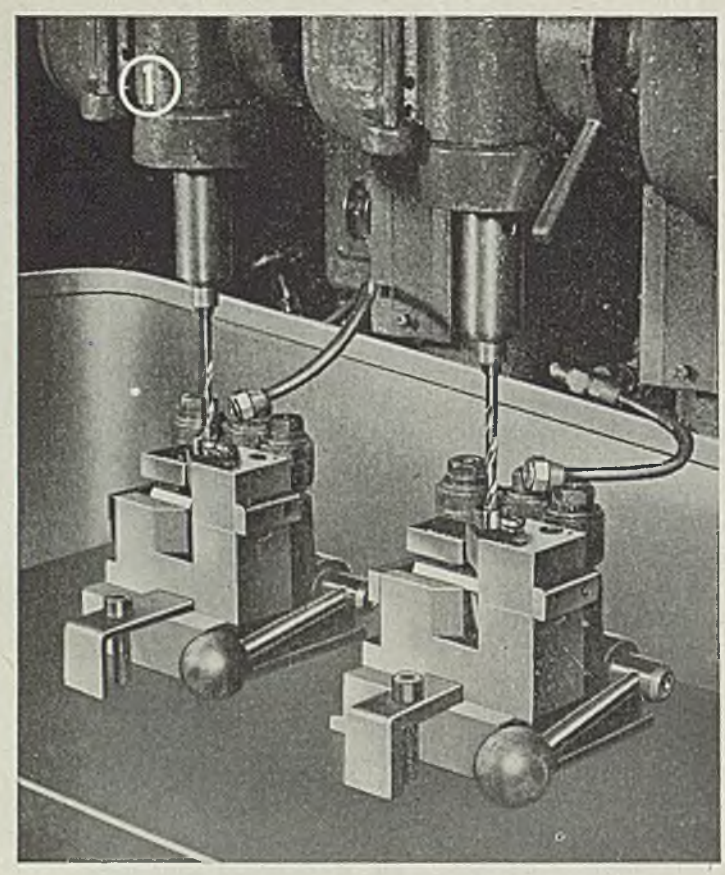
(*Please turn to Page* 111)

*Figs. 1 to 5—Arrows indicate path of air currents under different conditions of ventilation*

*Fig. 6—Overhead sheet metal duct headers are located above truss line*

*Fig. 7 — Plan and elevated views of building showing location of ventilating system*



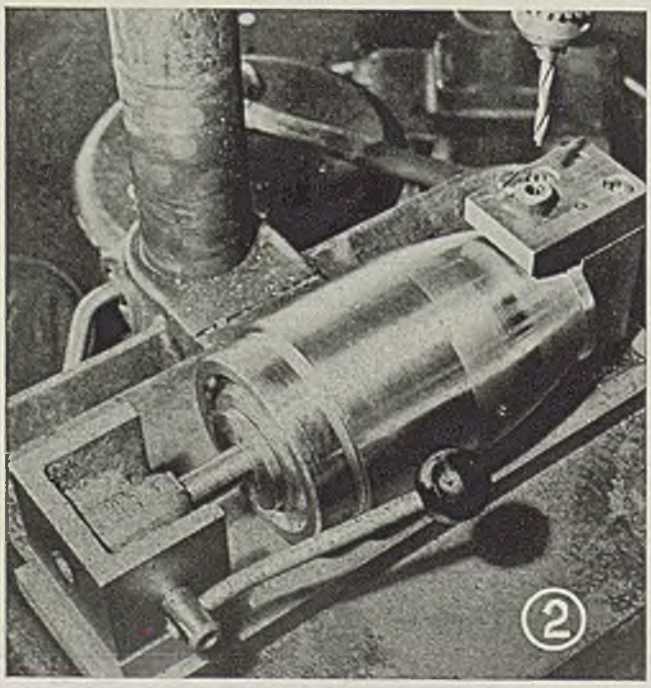


# Clamping Jig

*....obtains locking effect by generating opposing forces in sets of mated cones*

CONSTRUCTED to utilize the braking power of perfectly mated male and female cones, a unique clamping jig called the Cone-Lok has been developed. Features embodied in the unit are maximum safety, mechanical simplicity, rugged construction, adaptability, protection from chips, and sealed lubrication. It was developed by the N. A. Woodworth Co., Detroit.

The male cone is formed on the horizontal pinion shaft. It closely fits the female cone which is an integral part of the base. Two sets of cones are employed, one on each end of the pinion shaft; these are actuated by the end thrust of a helical gear and rack.



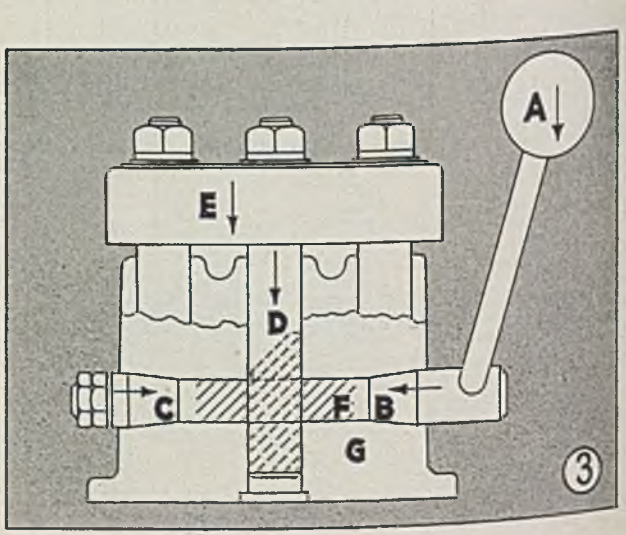
Pressure on the cone faces is obtained by generating opposing forces through application of weight on the tray, or pressure applied to the operating lever. Thus, locking effect may be obtained on either the up or down stroke. Fig. 3 graphically shows the action of the device. "A" rotates pinion "F", pulling down the rack "D" and tray "E". When tray "E" contacts the work, end thrust is developed by the helical pinion gear "F" and the rack "D", thus pulling cone "B" firmly against the internal cone in the base "G".

This lock is instantly broken by slight pressure on lever "A" in the opposite direction. If a heavy load or pressure is applied to the tray "E", the pressure of the rack teeth on helical pinion gear "F" causes an end thrust in the opposite direction, thus seating and locking the counter cone "C".

A minimum of wearing parts are employed in the jig, and it may be assembled or dismantled in a short time easily and without need for special tools. Amply proportioned parts of the jig provide great strength and a large margin of safety over any load.

All moving parts operate in an oil bath, and the design

(*Please turn to Page* 140)



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# What Frequency for INDUCTION AND DIELECTRIC HEATING?

*In this discussion, prepared for a high frequency heating conference sponsored by the Pacific Coast Electrical Association, Dr. Nielson tells what frequency is best suited for each type of induction and dielectric heating job*

By DR. RUSSELL A. NIELSON
*Manager, High Frequency Laboratory*
Westinghouse Electric Corp.
Los Angeles

WHAT frequency is best for induction heating? For dielectric heating? These are questions that arise whenever the matter of high frequency heating is discussed. Formulae, entailing the use of higher mathematics, are available for determining the answer to these questions. But since a better understanding of the subject can be grasped by the majority when presented from the fundamental point of view this method will be used here.

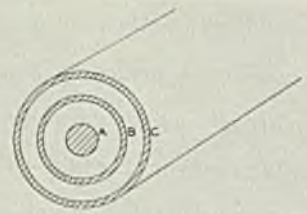
Introduction to frequency heating will begin with the application of very low frequencies and progress up the scale to frequencies as high as 100 million cycles per second. Such a presentation will cover induction heating, which is the heating of conducting materials, and dielectric heating, which is the heating of insulating materials.

### Induction Heating

While a complicated formula is frequently used to determine the watts into the load for induction heating, there is a method that is very understandable, yet one that gives a good approximation of the power into the load. The first step toward conceiving this method is to investigate where the current flows in a conducting material. Once this is understood it is an easy matter to comprehend why power is generated non-uniformly in a conducting material heated inductively by alternating current.

Consider, for example, a round conductor divided into 3 concentric circular sections marked A, B and C as shown in Fig. 1. Each section may be considered as an inductance and a resistance in series. Section A is linked by the flux generated by the total of the currents flowing in sections A, B and C; its inductance is, therefore, the maximum. Section B is linked by the flux due to the current flowing in B and C and by the flux from only part of the current in A; its inductance is, therefore, less than that of A. As section C links still less flux, its inductance is the minimum. If the resistivity of the cylinder is uniform, the impedance of A is greater than that of B which is in turn greater than that of C. Therefore, more current per unit of area will flow through C than through the interior parts of the cylinder. The current actually drops off exponentially from the surface as shown in Fig. 2.

Because the current tends to stay near the outer surface, this phenomenon is referred to as "skin effect." Fig. 2 applies for all frequencies; the only difference being that a different "distance scale" is used. In Fig. 3 a distance scale has been established in units of delta. Since the current curve is exponential, it is convenient to choose delta as the distance

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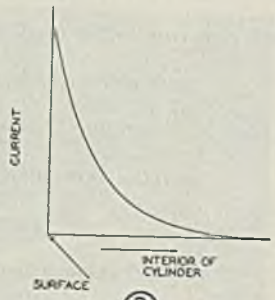


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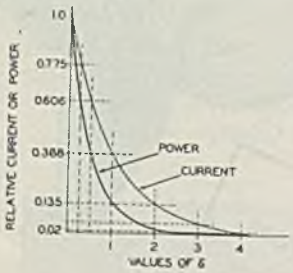


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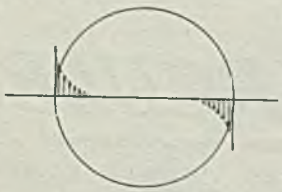

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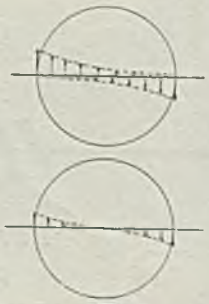

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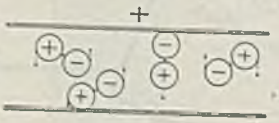


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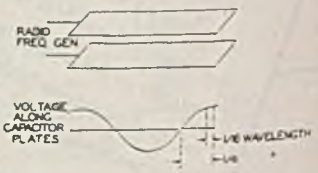


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# Hot-Dip Galvanized Pipe *Lasts Longest*

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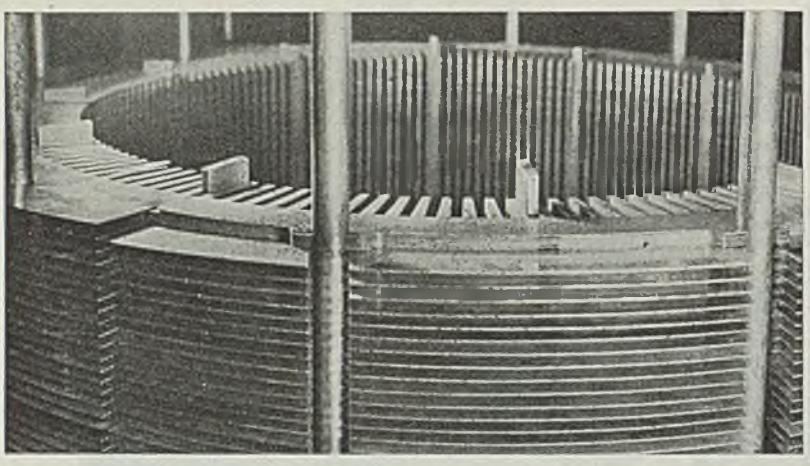

COPPER SANDWICH: Sandwiched in between magnetic iron punchings, these copper sheets project beyond the stators of large totally enclosed alternating-current motors to conduct heat away and provide increased surface for cooling air. The novel stator cooling method was developed at Westinghouse Electric Corp.

where the current is $\frac{1}{e}$ of its surface value ($\frac{1}{e} = \frac{1}{2.718} = 0.368$). At distance two delta, the current is $\frac{1}{e}$ of its value at one delta, i.e. = 0.135 of its surface value.

The heating effect or $I^2R$ loss can also be determined by adding another scale to the ordinate of this curve. Thus the power generated at the distance delta from the surface is approximately ⅛ of its surface value. In fact, 85 per cent of the total heat generated in the cylinder, is generated in the region less than one delta from the surface.

Delta, which is shown as "the depth of penetration," can be defined as follows:

$$\text{Delta} = 3170 \frac{\text{rho}}{\text{mu} \cdot \text{f}} \text{ inches}$$

where

rho = resistivity of the cylinder (ohm inches)
f = frequency in cycles
mu = permeability (equals unity for non-magnetic materials)

For a general illustration of induction heating, consider a 3-in. diameter cylinder surrounded by a work coil as shown in Fig. 4. Alternating current flowing in the work coil induces current to flow around the periphery of the cylinder, being a maximum at the surface and decreasing toward the center according to the formula for the depth of penetration of the current.

By putting the values applicable in this example into our formula, it is possible to find out exactly where the current flows in the cylinder that is to be heated. For copper, at room temperature, and 60 cycle current the depth is:

$$\text{Delta} = 3170 \sqrt{\frac{.66 \times 10^{-6}}{1 \times 60}} = .33 \text{ in.}$$

The current pattern is therefore as shown in Fig. 5, and 85 per cent of the heat will be generated within 1/3-in. of the surface.

It is frequently convenient to consider that all the current flowing around the piece is distributed uniformly across a section of thickness delta. Then, knowing the resistivity of the material and the average length of the current path, the power dissipated in the load can be calculated. This will give a value for power loss equivalent to that obtained by integrating the actual power loss over the entire cylinder. For example, in the case of the 3-in. copper cylinder, the depth of penetration was 1/3-in. and the path length was the periphery of the cylinder. If a 1-in. length of the cylinder is considered, then the power dissipated is:

$$\text{Watts per inch of cylinder length} = I^2R = (\text{Amps/in. of cylinder})^2 \times \frac{\text{periphery}}{\text{delta}} \times \text{rho}$$

or if a path along the periphery only 1 in. long is considered;

$$\text{W/in}^2 \text{ into cylinder surface} = (\text{amps/in})^2 \times \frac{\text{rho}}{\text{delta}}$$

$$\text{W/in}^2 = (\text{amp/in})^2 \times \text{rho} \times \frac{1}{3170} \sqrt{\frac{\text{mu} : \text{f}}{\text{rho}}} = (\text{amps/in})^2 \times 3.16 \times 10^{-4} \sqrt{\text{mu} \cdot \text{f} \cdot \text{rho}}$$

The only unknown is the current flowing around the cylinder. In the foregoing example, if the cylinder is put into a long coil, it will act as a single-turn-shorted secondary of a transformer, the primary of which is the work coil. In such a case the number of ampere turns in the secondary equals those of the primary. The amperes per inch in the secondary will then equal the ampere turns per inch of the primary. Thus for a cylinder in a long coil it can be seen that the watts per square inch into the cylinder's surface is independent of the cylinder's size; i.e., in a large cylinder the same current flows in a longer path, thus the larger the diameter of the cylinder, the greater the total heat generated.

If the copper cylinder is heated to 950°F, the only change that occurs is an increase in the resistivity of the copper by a factor of three. This results in an increase in the depth of penetration and in the watts by a factor of the square root of three; thus, there is more heat and it is generated more uniformly throughout the cylinder. It is true in general, that as the temperature of a non-magnetic load is increased, both the power into it and the depth of the heated zone increase. This is due to the fact that the resistivity of metals increases as the temperature rises.

Next consider an iron cylinder at room temperature, the resistivity of which is $4 \times 10^{-6}$ ohm inches and, the permeability of which shall be arbitrarily assumed as 36. (The actual value of the permeability depends upon the intensity of the magnetic field at the surface of the work; it is thus a function of shape, size, and current in the work coil.) The depth of penetration is 0.4 that of the copper cylinder (i.e., 0.13 in.). However, a change of considerable magnitude has occurred for the power into the cylinder. The increased resistance and the permeability have both contributed to increase the power to almost 15 times that of the copper at room temperature. If this iron cylinder is heated to 1300°F, the increase in resistance results in an increase in the depth of penetration and power input by a factor of three. If the temperature is raised another 150°F, a sudden change occurs; the iron becomes non-magnetic and its permeability drops to unity. This results in an increase in the depth of penetration by a factor of 6 and a corresponding decrease in the power into the work. In the case of all magnetic materials, there occurs quite a sudden change of load as the material passes through the Curie temperature, which is the transformation temperature, above which the material is non-magnetic.

As a final example, consider the depth of penetration for a 3-in. cylinder of stainless steel, the resistivity of which is $13.5 \times 10^{-6}$ ohm in. The depth of pene-

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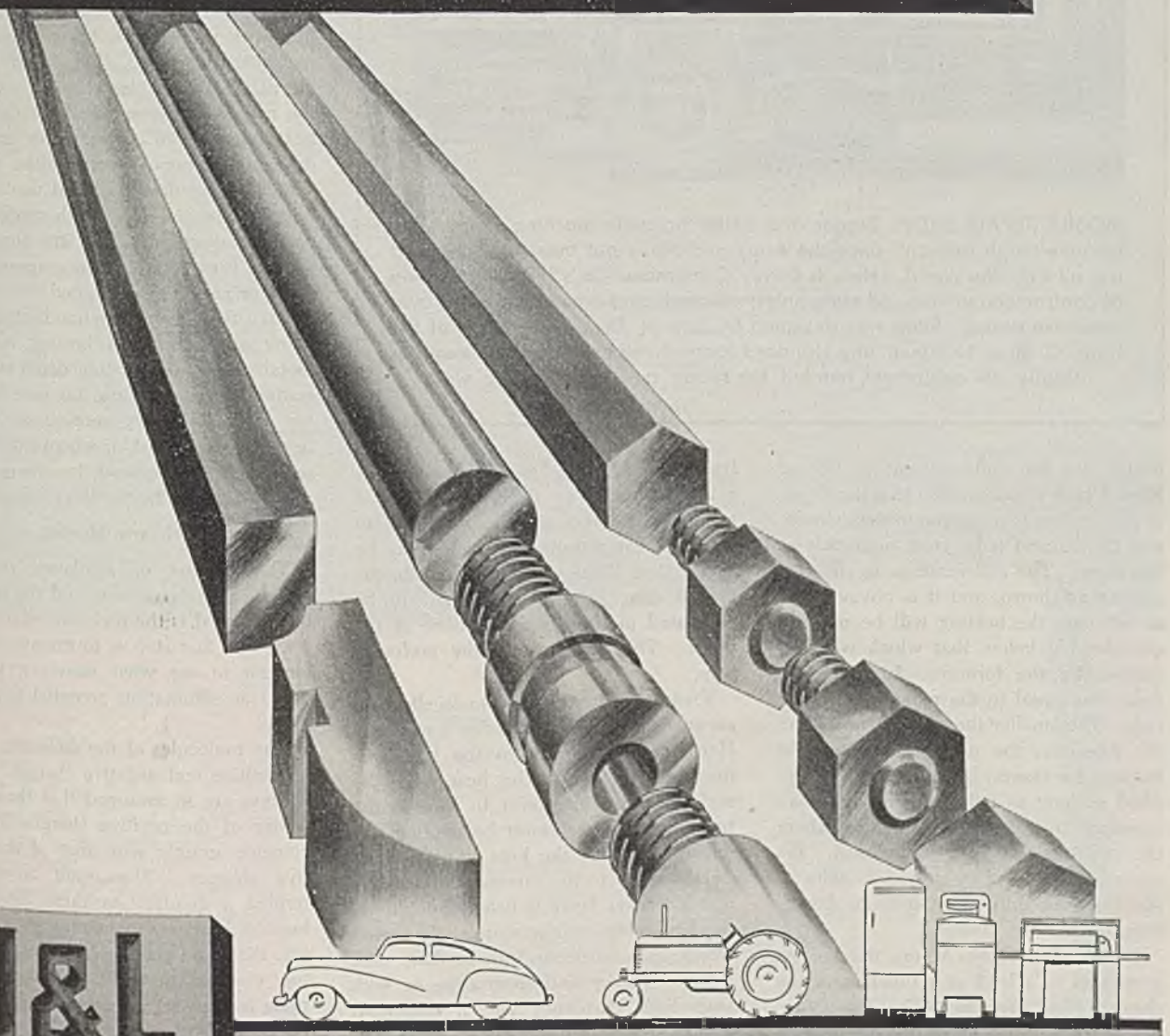

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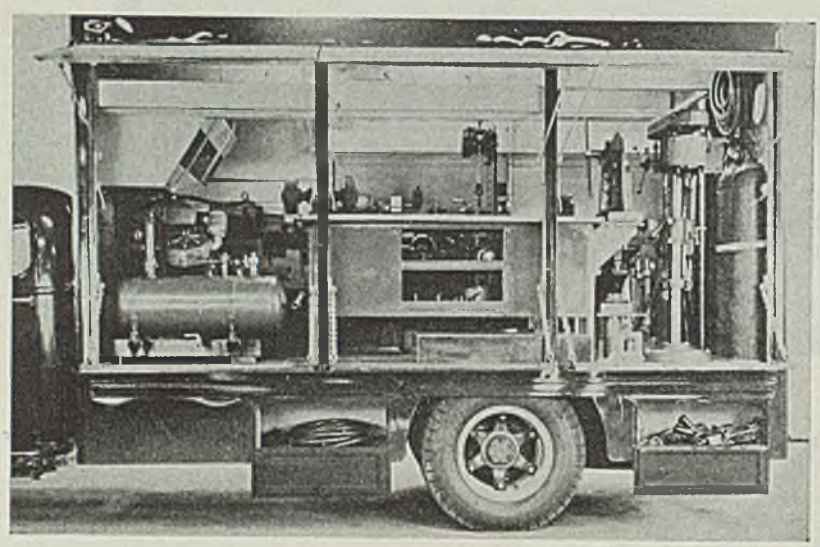


MOBILE REPAIR SHOP: Bigger and better portable machine shops have become "high fashion" since the Army and Navy put them to such good use all over the world. Here is Davey Compressor Co.'s bid for attention of contractors, utilities, oil companies, railroads and others operating over extensive areas. Shop was designed by Paul H. Davey, president of the Kent, O. firm, to mount any standard long-wheelbase truck. It contains virtually all equipment needed for repair and maintenance work

tration for 60 cycle current is 1.5 in. From Fig. 6 it can be seen that the depth of penetration is so deep into the cylinder that the current is far from negligible at its center. The end result is an effective current as shown, and it is obvious that in this case the heating will be reduced considerably below that which was calculated by the formula. In this case, delta was equal to the radius of the cylinder. The smaller the delta compared to the diameter, the more accurate is the formula for power; but it can still be applied so long as delta remains less than one-third the diameter. In cases where the material is not cylindrical, the formula also applies provided delta is less than one-third the minimum dimension.

It has been shown where the heat is generated in a load as a function of the depth of penetration. The frequency, which so far has been 60 cycles, also affects the depth of penetration since the formula for delta contains the factor "square root of frequency." Thus, if the frequency is raised to 6000 cycles, the depth of penetration would be decreased by a factor of 10; if the frequency is 600,000 cycles per second, the depth of penetration is one one-hundredths of its former value (i.e., it is only 0.015 inch for the stainless steel cylinder).

So far the discussion has been confined to where the heat was generated; now a word about the end result. If a piece of metal is to be heated throughout its mass, it can be done in two ways: First, by high frequency; second, by low frequency. In the first case the heat is generated close to the surface of the piece and it takes time for the heat to soak into the interior parts; this may be a long time if the piece is large. In the second case, more of the heat will be generated in the deeper sections of the piece. This of course is the preferred way.

Frequently it is desired to locally heat an area, or to surface harden something. Here it is convenient to use high frequency to generate the heat near the surface, and high power to shorten the time that the heat must be applied, for during this time the heat is being conducted away to the interior of the piece and a thicker layer is being brought up to hardening temperature. In other words, case hardening can be done with high frequency and short time or with very high frequency and a somewhat longer time with lower power input. The question that immediately comes to mind is why not just keep raising the frequency so as to further localize the heat. This is done up to frequencies of about one million cycles per second. At frequencies above one megacycle technical difficulties arise. Though successful hardening has been done at 10 megacycles, one megacycle is generally considered as a working maximum for induction heating.

Now just a word as to the nature of the difficulties encountered. So far a cylinder in a long solenoid has been considered. As the frequency is increased, the impedance of the work coil increases and eventually a limit is reached where even with a minimum of inductance in the work coil, the voltage between turns of the coil or the voltage between the coil and the work has become large enough to cause arcing. Technical difficulties arising from an attempt to get the required power into the work without arcing, is what sets the upper limit of frequency used for induction heating.

From the formula for watts into the load, it can be seen that the power increases as the square root of the frequency. Thus by increasing the frequency, the same heat can be put into the work using fewer turns or less current in the work coil. For example, heating at 600,000 cycles requires one-tenth the ampere turns required for the same heat input at 60 cycles. This large reduction in ampere turns often greatly simplifies the design of coil used at the high frequencies since with small pieces or for heating local areas, the number of ampere turns that can be coupled to the piece or area is often limited.

High frequency induction heating finds many applications in heating of small metal pieces, and its thin depth of penetration indicates its use for case hardening. Where heavy sections are to be heated or hardened, or where a deep heat penetration is required, low frequency—sometimes even below 60 cycles—is used.

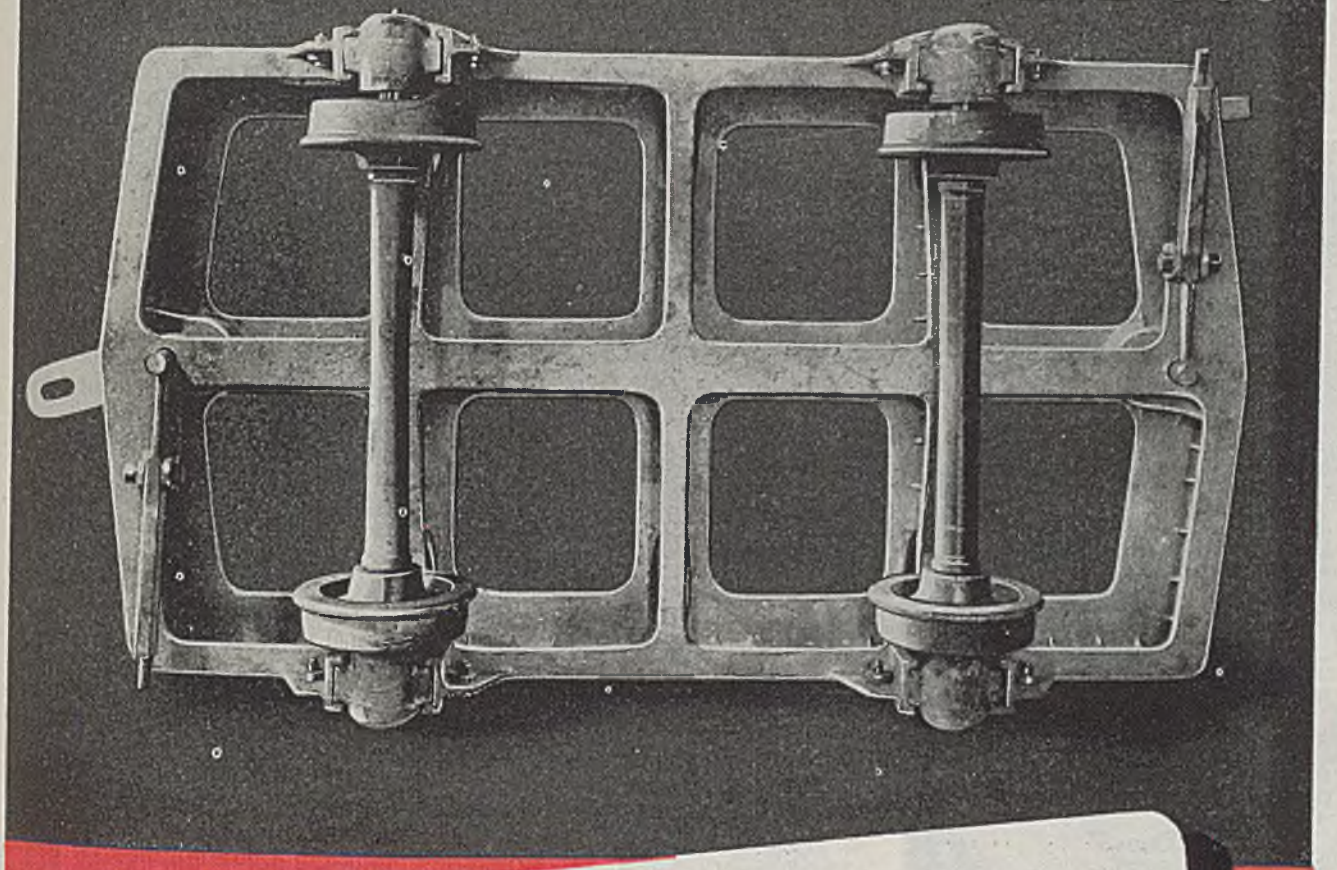
### Dielectric Heating

The heating of insulating materials will be considered next and the material to be heated is the dielectric of a capacitor. The first step is to examine the dielectric to see what causes it to heat when an alternating potential is applied to it.

The molecules of the dielectric consist of positive and negative charges. These charges are so arranged that the density center of the positive charges does not coincide exactly with that of the negative charges. The result is what is termed a dipole. As these dipoles are located between the plates of a capacitor, they find themselves in an alternating electrostatic field. When the top plate is positive, the negative charges are pulled toward it and at the same time the positive charges are pulled toward the lower plate as shown in Fig. 7. The molecules thus tend to rotate or to be stretched in the direction of the field. When the potential reverses, the opposite is true; the positive charges are attracted toward the top and the negative charges toward the bottom. The molecule is thus agitated, and this agitation results in an energy loss of a certain amount per cycle and this loss is transformed into heat in the dielectric. In a homogeneous dielectric, the agitation is the same for all molecules so that heat is generated uniformly throughout the dielectric ma-

(*Please turn to Page* 112)

# STEEL CASTINGS BY PSF...



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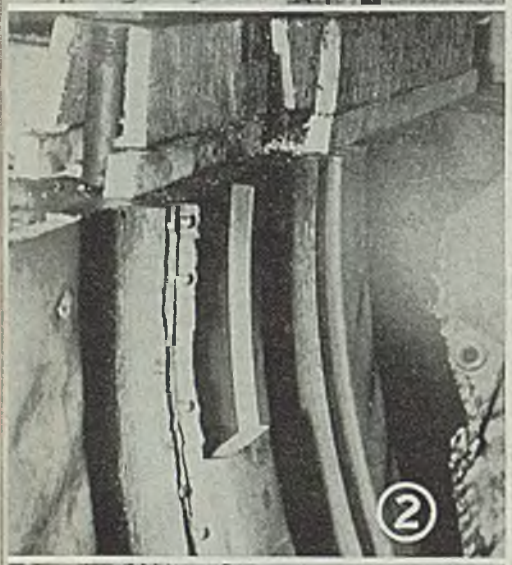

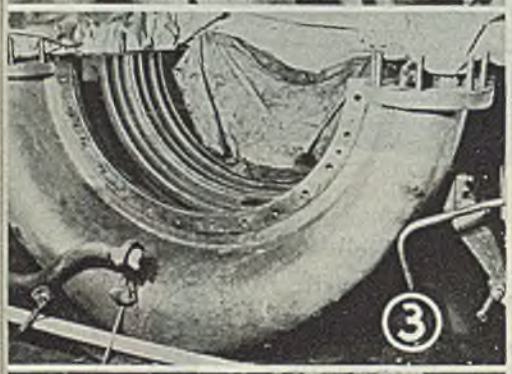

# Rebuilt Turbine housing

*Restoration of eroded surfaces by rebuilding with sprayed metal keeps irreplaceable unit in service*

STEAM turbine installed in 1919 in the power house of a New England branch plant of a large manufacturer had been suffering progressive erosion of the housing from wet steam over a period of 23 yr. Recent inspection indicated that this condition (Fig. 1) had reached a point where the machine would have had to be scrapped unless some means could be found to arrest further deterioration and to repair one section where the area of an edge holding one of the diaphragms in place was badly eroded. As a new turbine was not then obtainable, metallizing was employed to salvage this equipment.

Henry W. Atwood, field engineer, Metallizing Co. of America, Chicago, states that on sections of this job where the rebuilding of strength or of original dimensions was not a factor a coating of No. 1 (18-8) stainless steel sprayed to a thickness of approximately 0.025-in. was recommended. Due to the design of this turbine, the erosion which had taken place had not in any way affected machine efficiency. Therefore, it was not necessary to restore the original dimensions and the coating 0.025-in. thick will arrest any further deterioration for the remaining life of the other parts of the machine.

In order to avoid marring finish of channels in which diaphragms are held, masks made of wood sections and covered with sheet rubber packing were made and fitted tightly in place as shown in Fig. 2. Upper half of the turbine was treated first. A round frame work was erected around it to carry tarpaulins in the form of a tent (Fig. 3) to prevent the steel grit used in cleaning and roughening the sections to be sprayed from flying and to prevent the scale and dust blasted out of the housing from getting into surrounding machinery.

Blasting operation was carried out one section at a time and the spray applied immediately after each section was blasted. This was done to prevent cleaned surface from becoming contaminated by dust from the other sections and to eliminate any possibility of oxidation of the prepared surface during preparation of the next section.

Fig. 4 shows method of mounting the metallizing gun in order to relieve operator of the strain of holding the gun during the spraying process and also to in-

(*Please turn to Page* 142)

*Fig. 1—Rim of turbine housing after last stage diaphragm was removed. Erosion was severe, averaging ⅝-in. in depth*

*Fig. 2—Wood block covered with sheet rubber packing was used to protect surfaces not to be sand blasted*

*Fig. 3—Surrounding equipment was protected from flying grit by this tent around portion of machine to be metallized*

*Fig. 4—A jig relieves operator of fatigue from holding gun, and also affords a uniform coating by keeping gun at uniform distance from surface*

*Fig. 5—Area of turbine casing built up 0.025-in. with stainless steel*

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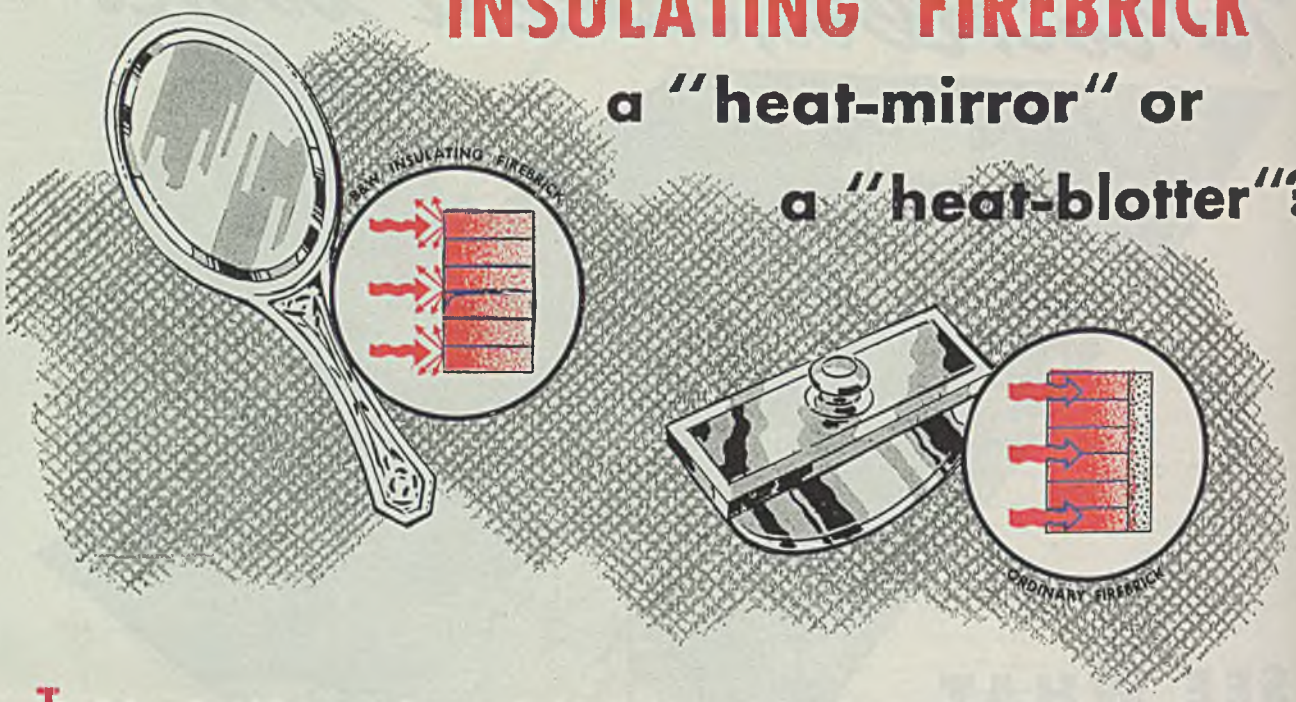
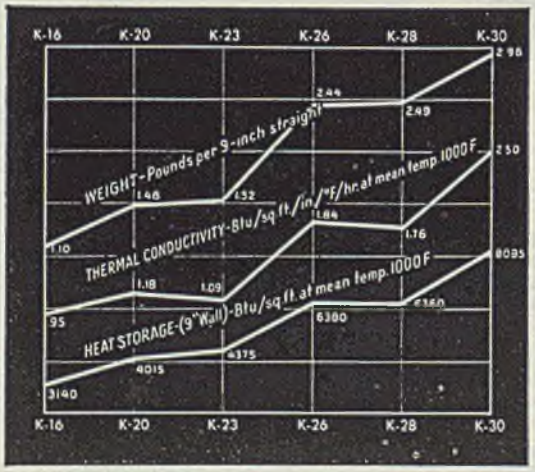
## ROCKFORD MACHINE TOOL CO., ROCKFORD, ILLINOIS

# Is your INSULATING FIREBRICK a "heat-mirror" or a "heat-blotter"?




The lighter the I.F.B. in your furnace, the less it "blots up" heat, because heat conductivity and heat absorption vary with the weight of an insulating firebrick. And B&W I.F.B. have the lightest weight.

B&W I.F.B. act as "heat mirrors"—they come to temperature on the surface quickly (very little heat penetrates the brick; most of it is thrown back into the charge where it can do useful work).




The savings, over the life of the brick, that result from this "heat mirroring" can often equal the cost of the brick itself. The graph shows the relationship between weight, conductivity, and heat storage of B&W Insulating Firebrick.

Your local B&W Refractories Engineer can help you reduce your furnace operating costs through the use of B&W I.F.B. A call or a post card will bring him . . . no obligation, of course.

R-232

Water-Tube Boilers, for Stationary Power Plants, for Marine Service . . . Water-Cooled Furnaces . . . Superheaters . . . Economizers . . . Air Heaters . . . Pulverized-Coal Equipment . . . Chain-Grate Stokers . . . Oil, Gas and Multifuel Burners . . . Seamless and Welded Tubes and Pipe . . . Refractories . . . Process Equipment.

**BABCOCK & WILCOX**

THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
85 LIBERTY STREET, NEW YORK 6, N.Y.

## Mill Building Ventilation

(*Continued from Page* 99)

drop back down, not vertically since that would interfere with the rising current, but along the outside of the building where further cooling from the walls causes this descending air to become heavier and thus drop faster. At the floor, these currents are again warmed and continue their path to the roof. In the winter, naturally, this gravity circulation within the building is much more pronounced than in summer due to the greater cooling effect of the roof and walls.

The fumes to be eliminated are the result of heat producing operations near the floor of the building, such as spent gases from heat treating furnaces or smoke from forging operations. Therefore, in considering Fig. 1, the fumes logically tend to rise toward the roof with the warm air currents. Likewise, the first step in eliminating the fumes is to permit them to escape through a hole in the roof at the peak as provided by the roof ventilator indicated in Fig. 2. Venting the fumes as in Fig. 2 solves one problem, but adds another. The air passing out through the roof ventilator must be replaced in the building. During the summer this is not too serious a problem if the building is exposed on at least two sides so that adequate outside air may be drawn in to replace the exhausted fumes. In the winter, this replacement air must be introduced at a temperature at least as high as the normal building air temperatures to prevent chilling. Further, it is necessary that the makeup air be introduced and tempered in such fashion as to not interfere with the natural flow of fumes to the roof ventilators. Otherwise, the efficiency of the roof ventilators for taking out the highest concentration of impurities is reduced.

If, for example, this makeup air is permitted to merely leak in through the loose building construction, and steam pipe coils or gravity radiators are located around the exterior of the building to maintain temperature, air currents counter to the normal gravity flow of Fig. 1 will be set up and thereby reduce the pull of the ventilator on the interior area of the building. This is shown in Fig. 3, which indicates the air currents from the heating units rising along the sidewall rather than up through the center of the building, thereby creating a stagnant condition in the interior of the building. Fumes and foul air originating in the middle of the building are circulated throughout the floor area instead of rising directly to the roof vents. Similarly forced circulation of air from suspended unit heaters, as shown in Fig. 4, interferes with flow of fumes rising to the roof and tends to cause a more thorough mixing of the air and fumes in the building so that the roof vent handles only a diluted sample of the undesirable fumes, while the entire building area is subjected to the fume condition.

From the standpoint of fume removal, any method of ventilation which depends upon high velocities for distribution is undesirable in that the high velocities tend to break up the natural flow of fumes to the roof ventilator.

### Introduced at Floor Level

The most desirable arrangement involves the introduction of makeup air at or near the floor level at low velocities as indicated in Fig. 5. Introduction of the makeup air in this manner tends to aid the natural air circulation in the building so that the fumes rise directly to the roof ventilator.

Based on the general theory outlined, the ventilation and heating system for the shell building at Weirton Steel was developed. Lack of floor space made it necessary to elevate all equipment above the craneway. Two large fan and heating coil units, like that shown in Fig. 8, were installed at approximately quarter-points of the length of the building (see plan view Fig. 7), supported by reinforced roof trusses. Each of the fans handle 125,000 cfm of air which is equivalent to an overall volume change in the building of about three changes per hour.

The heating coils (see cross section, Fig. 7), constructed of heavy wall 1¼-in. diam standard steel pipe, schedule 40 and equipped with external finned surface to increase the heat transfer capacity, were used to withstand the steam condition at 250 psi pressure and 500° F total temperature aforementioned.

By calculation, it was determined that the building could be maintained at 70° F inside when the outside temperature was zero if the total 250,000 cfm fan capacity were heated to a final temperature of 120° F. Sufficient coil surface was installed to heat the full 250,000 cfm from a zero entering air condition to 120° F so that full ventilation could be provided if necessary even when the outside temperature dropped to zero degrees F.

Automatic mixing dampers on the outside air intake and the recirculating air connection were provided so that partial recirculation of air could be used, if desired, when the outside air temperature dropped below freezing, to economize on steam consumption.

Tempered ventilation air is supplied from the two fans into long overhead sheet metal duct headers which run around the ceiling of the building above the truss line as shown in Fig. 6. A sheet metal downcomer duct designed so as not to protrude beyond the crane column line was installed at each column around the building, and along the center column line. These downcomers terminate in a 45° angle down flared connection about 4 ft above the floor level, so that the tempered air is diffused at relatively low velocity near the floorline. Full extent of the distribution system may be better appreciated by studying plan view, Fig. 7.

This continuous supply of tempered fresh air near the floor level made it pos-

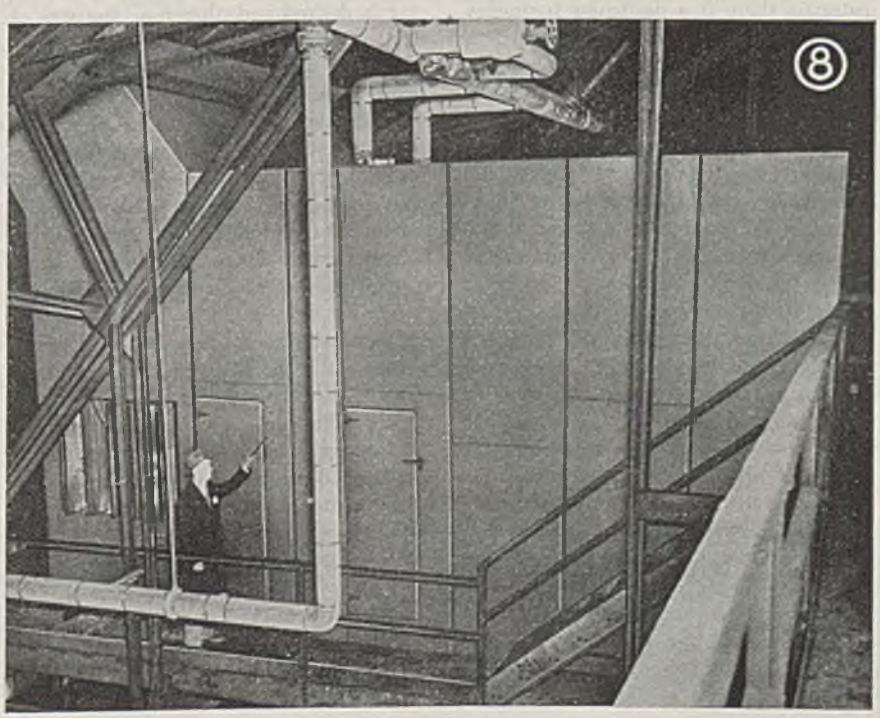



*Fig. 8 — Compartment which houses large fan and heating coil units*

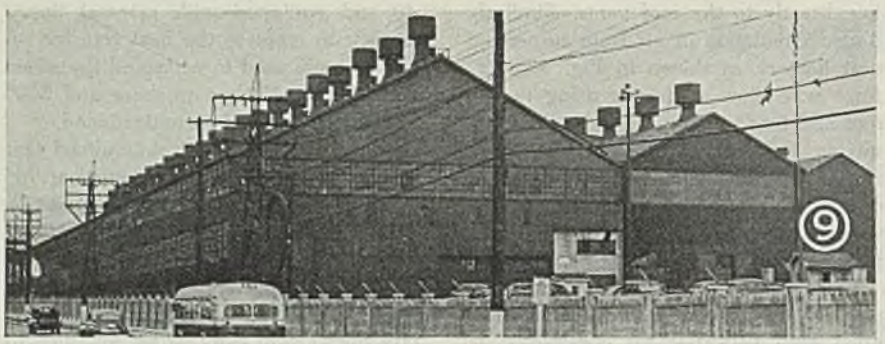


*Fig. 9—Exterior of mill building showing type of ventilators installed in roof*

sible to maintain acceptable working conditions in the occupied portion of the building. A marked difference in air pollution could be noted in the upper section of the building, particularly above the truss line where the smoke and fumes were dense even though the atmosphere in the zone of normal occupancy, within 10 ft of the floor line, was clear.

Since the peak of the building is about 65 ft above the floor line, it can be seen that the economics of the situation warrant a considerable investment in equipment to properly distribute the tempered ventilation air so that it is used where most necessary. Systems which depend upon high velocity air distribution and which must therefore work on an average air pollution throughout the building rather than in the occupied zone alone must necessarily circulate larger quantities of air and therefore use more steam for tempering the air.

Similar systems of tempered ventilation air are now being installed by Weirton Steel Co. in two other mill buildings, each of approximately the same overall size as the installation described herein. Details of installation vary, of course, to suit the buildings, but the principle of air distribution is the same.

## Frequency In Heating

(*Concluded from Page* 106)

terial. This power loss can be expressed by the formula:

$$W = 1.41 e'' f E^2$$

where

W = watts per cubic inch (into the dielectric)
e″ = loss factor (the energy loss per cycle)
f = frequency in cycles
E = voltage gradient (volts per inch across the dielectric)

For low loss materials, the loss factor "e" is the product of the power factor and dielectric constant of the material. In general, both the power factor and dielectric constant change slightly with frequency; they are quite dependent on temperature and upon the percentage of moisture in the material, etc. For some materials there is a particular frequency at which the loss factor goes through a maximum. However, it does not necessarily mean that that is the optimum frequency to use for heating. As the power loss is a product of loss factor and frequency, it is often desirable to go to frequencies beyond the maximum loss factor such that the product of loss factor and frequency is larger. The maximum usable voltage gradient decreases slightly with increasing frequency.

The dominant variable in the power formula is the frequency. For most insulating materials, the frequency must be raised to approximately one million cycles per second before appreciable power is delivered to the dielectric. There are three factors which dictate what frequency shall be used for any specific heating application. On the low frequency side, the frequency must be high enough to produce heat in reasonable quantities. On the high frequency side, two factors limit the frequency; the first is the question of standing waves and the second is the difficulties encountered in and with radio frequency generators of high power and high frequency. First, consider the question of the standing waves. Capacitor plates act as open-ended transmission lines with the result that there are standing waves which, at 3 mc and with air as the dielectric, have a wave length of about 325 ft. The variation of voltage along the capacitor is as shown in Fig. 8. Throughout every half wave length there are points where there is no voltage, interspaced by points where the voltage is a maximum. It is obvious from this that if an attempt is made to heat a dielectric material in that capacitor it would become heated in local regions every half wave length since the heating is proportional to the square of the applied voltage.

In dielectric heating uniformity of heating is desired and, therefore, the size of the electrodes is limited to about one-sixteenth wave length. This value is chosen because, as shown in Fig. 8, the voltage across or along an electrode of one-sixteenth wave length changes by only 7 per cent. Since heating is proportional to the square of the voltage, it is uniform within 14 per cent. If the electrodes are longer than one-sixteenth wave length, the heating becomes non-uniform very rapidly. Any dielectric placed between the capacitor plates decreases the wave length by the square root of the dielectric constant. If wood whose dielectric constant is about 4 is considered, the wave length has decreased by a factor of 2, electrodes no longer than 10 feet should be used. In other words, if it is desired to heat something whose dielectric constant is 4 in a set-up where the distance between the capacitor terminals and the farthest end of the capacitor plate is more than 10 ft, a frequency below 3 mc must be used. This will result in a proportionate decrease in the possible power input per cubic inch of material, since the power is directly proportional to the frequency. However, if this piece of wood being used as an example had a maximum dimension of one foot, the frequency could be increased by a factor of 10 which would give a heating rate approaching 10 times that of the former case. In other words, if the same material is considered, and it is desired to heat it rapidly, in general, a frequency as high as possible consistent with the dimensions of the piece to be heated should be chosen; the smaller the piece, the higher the frequency that may be used.

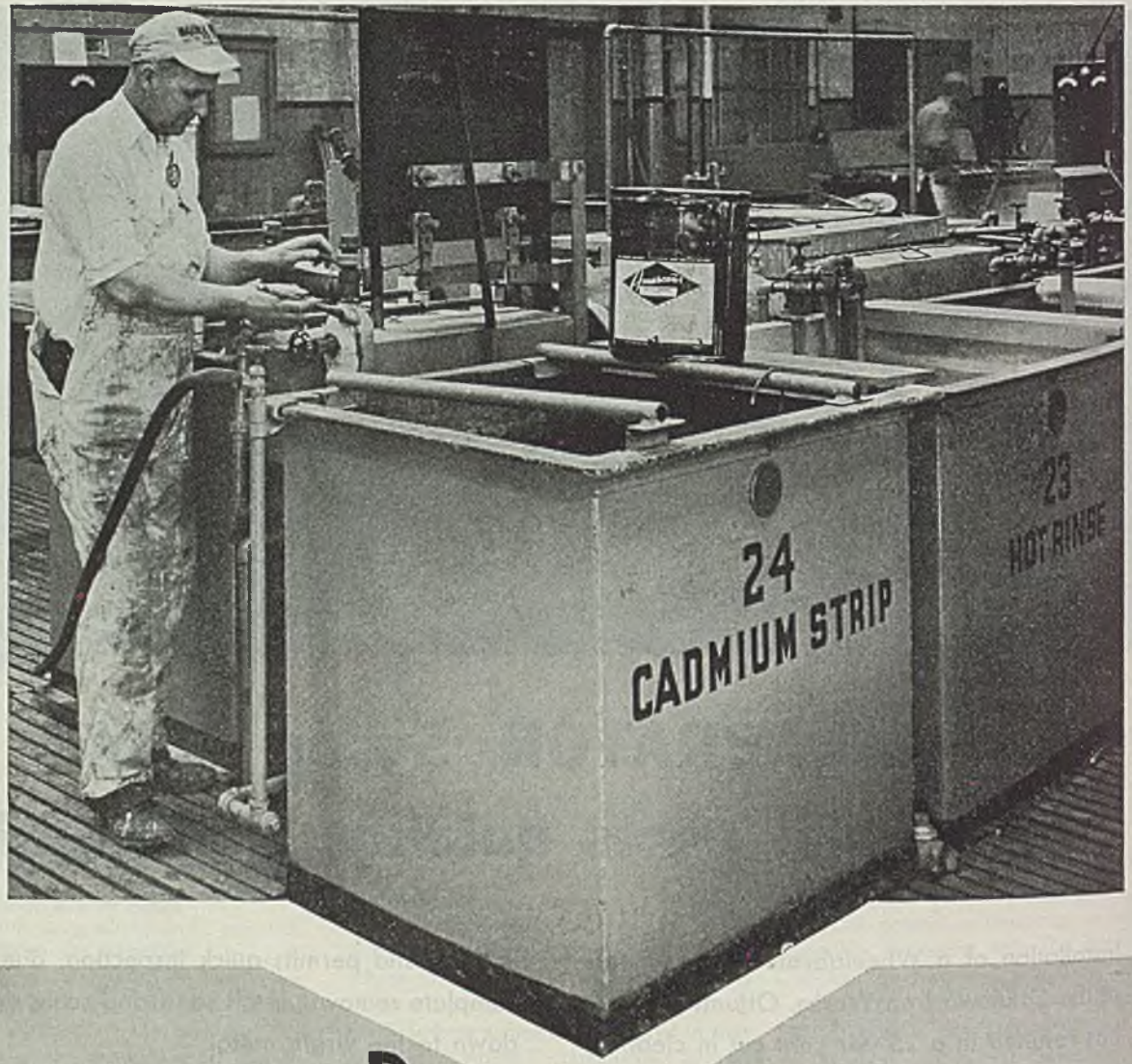
There is one further limitation to the power that can be generated within the dielectric, and that concerns the generators themselves. A high power radio frequency oscillator requires a large circulating KVA in its tank circuit. The frequency of an oscillator is:

$$f = \frac{1}{6.28\sqrt{LC}}$$

where

f = frequency in cycles
L = inductance (henries)
C = capacity (farads)

The maximum frequency is obtained with a minimum of the product LC. Since the maximum voltage of the tank circuit is generally limited in value, the capacity should be maintained large in order that the KVA shall be large. As the frequency of a high power oscillator approaches 30 to 50 megacycles, it will be found that the limit of decreasing the inductance of the tank circuit has been reached. In fact it becomes nothing more than the leads themselves. Higher frequencies, therefore, require a reduction in the value of the capacitor which means a decrease in the KVA of the tank circuit and therefore in the output of the oscillator.




# Corrosion-Resistant *Plastic Coating*

*. . . . is easily and economically applied to plating room equipment*

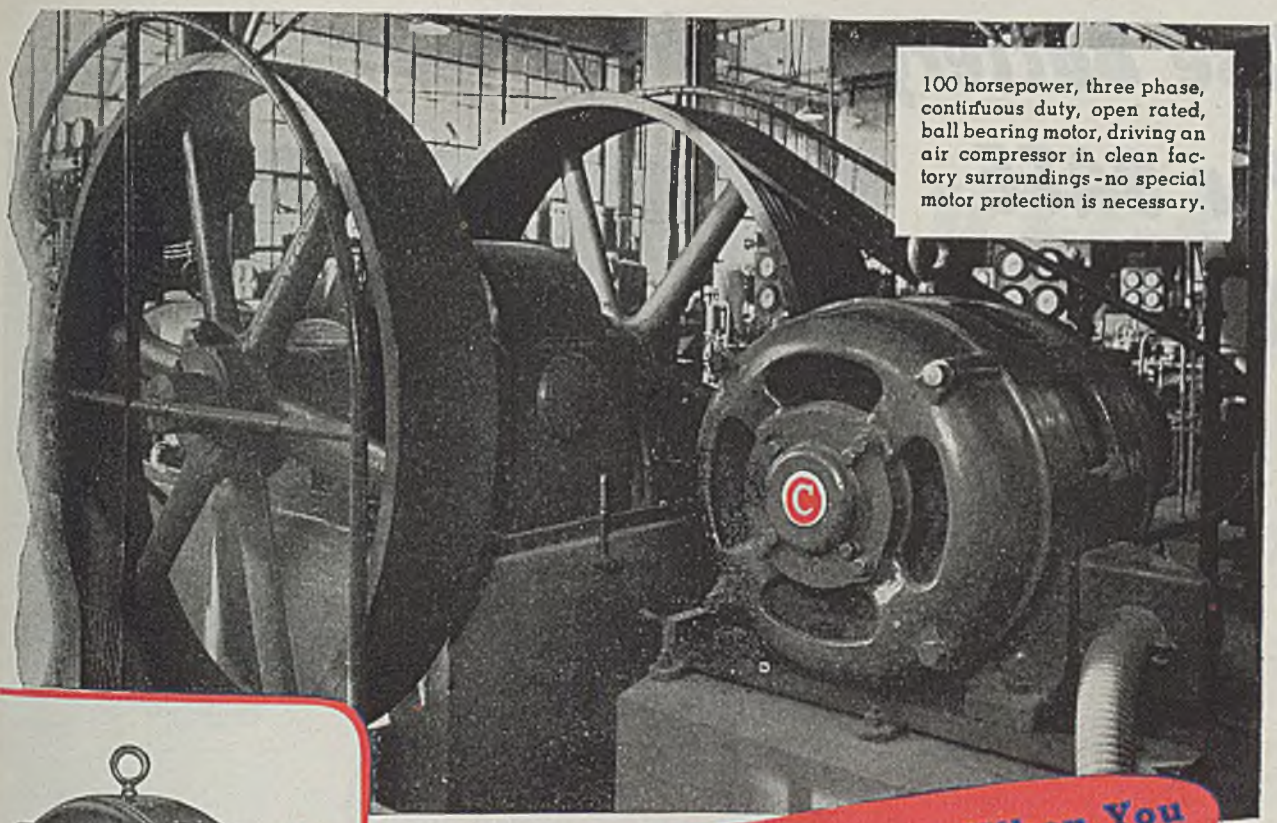
EXTREMELY severe corrosion which exists in most plating rooms and on plating room equipment is well known by the industry. The fumes from pickling baths and chrome tanks, together with the drip and spillage from sodium cyanide, chromic and sulphuric acids, copper sulphate, sodium hydroxide, and other plating chemicals, create a complex problem requiring a versatile material to stand up under the varied corrosive plating solutions.

Many different surface treatments have been tested over a period of years at Amertorp Corp., U. S. Naval Ordnance Plant, Forest Park, Ill., resulting in the discovery of a coating which appeared to have all of the required properties: Easy application by plant employes and apparatus; relatively low cost (when applied in 5 coats, it has a total labor, material and sandblasting cost of only 16c per sq ft); toughness, abrasion-resistance and excellent adherence over steel, concrete or wood surfaces. Its heat resistance was adequate even for the exterior of tin plating tanks at 160° F.

In areas where it was exposed to continuous damp and humid conditions, it stood up well, having a moisture absorption so low as to be negligible. Its acid and caustic resistance was good. On equipment exposed to oils and greases, it showed no effect from these petroleum products.

This material was applied to 71 steel tanks, 6 wooden tanks, a number of plating rack frames, and several large fume ducts. Today, after from 1 year to more than 18 months' continuous exposure, it is still in its original condition.

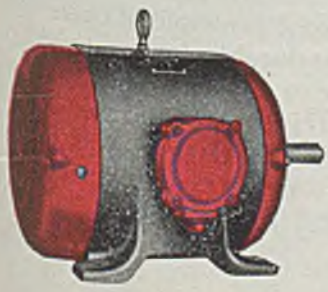
(*Please turn to Page 144*)



100 horsepower, three phase, continuous duty, open rated, ball bearing motor, driving an air compressor in clean factory surroundings - no special motor protection is necessary.

Form J
General Purpose Application

Splash Proof Protection



Explosion Proof

# You Get Top Performance When You Select the Right Motor from CENTURY'S Wide Range of Types and Sizes

Top performance over the longest period of time is the result of selecting the correct type and size of electric motor. Century's wide range of types and sizes will satisfy all popular requirements.

Century motors are built in open protected, splash proof, totally enclosed fan cooled, and explosion proof types; with rigid, cushion, horizontal, or vertical mountings. Century motor sizes range from 1/20 to 600 horsepower and are available in single phase, three phase, and direct current types.

There is a Century motor with the correct electrical characteristics to meet the load requirements — and with the right frame to adequately protect the motor from any hazardous atmospheres. By selecting the correct Century motor you get top performance.

Be sure you get top performance from your electric motor driven installations — specify Century.

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**CENTURY ELECTRIC CO.**
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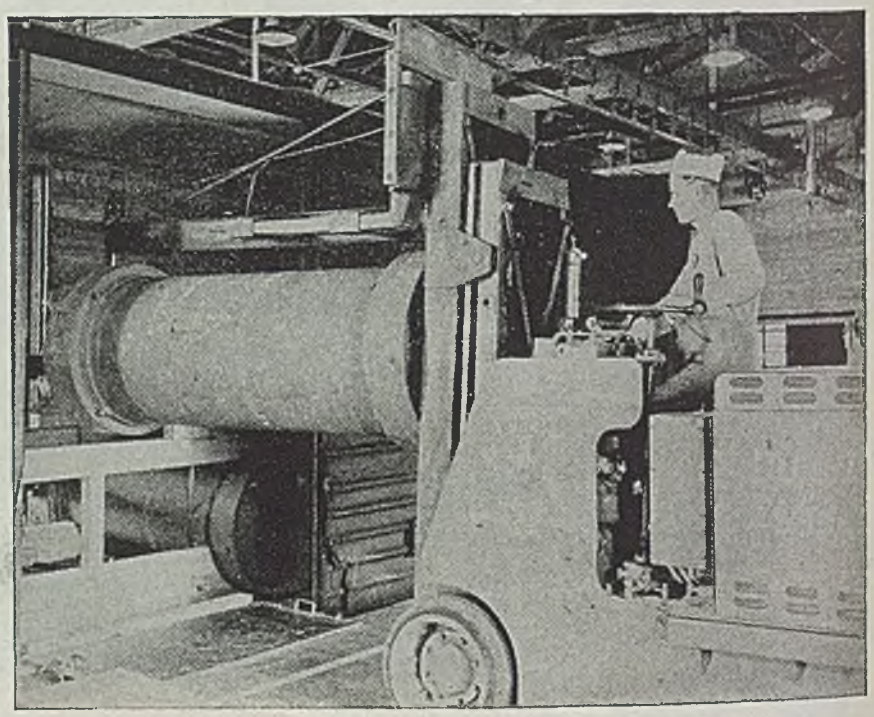
# Use Battery Trucks for SAFE handling



## ...Alkaline Batteries for Most Dependable Power

One of the outstanding advantages of battery industrial trucks for material handling is their inherent safety. Because they give off no fumes and are practically free from fire hazards, they can be used without restriction in almost any kind of plant. They can even be provided with spark-enclosed construction for safe operation in hazardous locations. Many are operating successfully in ordnance depots.

With batteries exchanged two or three times per 24-hour day, the truck is kept continuously supplied with power. While one battery operates the truck, another is being charged. Except for the few minutes needed to change batteries, the truck need not stop for servicing its power unit. Its electric motor drives have a minimum of wearing parts; are inherently simple and trouble-free. The truck starts instantly; accelerates smoothly; operates quietly; consumes no power during stops. Not only does it make efficient use of power but the current used for battery charging is the lowest-cost power available.

Thus the battery truck is an inherently dependable, safe and economical handling unit, especially when powered by Edison Alkaline Batteries. With steel cell construction, a solution that is a natural preservative of steel and a fool-proof principle of operation, they are the most durable, longest-lived and most trouble-free of all batteries. Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, N. J. In Canada: International Equipment Company, Limited, Montreal and Toronto.

**Edison**

ALKALINE BATTERIES

# TRUCK METHOD OF *handling* SPIKE KEGS

*Clever use of steel floor-plate type pallets and specially built keg cages facilitates handling of spikes and bolts from production to warehouse to freight car, or the reverse*

TYPICAL materials handling problem recently solved by engineers of Inland Steel Co., Indiana Harbor, Ind., involved the handling of kegs used in the shipment of spikes and bolts produced by the company. Original method, employing two-wheeled trucks, proved inadequate for fast hauling of these kegs from filling stations on the production line to the warehouse, and then to freight cars for loading.

First problem according to C. E. Chapman, division superintendent, was to design a special skid plate or pallet which would accommodate 12 kegs weighing 200 lb each and yet be able to pass through any freight car door. The 45 x 55-in. dimension decided upon accomplished the desired result.

Inasmuch as construction of the pallet was influenced by the weight of the kegs to be carried, a $\frac{5}{16}$-in. thick, 4-way floor plate was selected for the bed of the pallet. To this four medium-size I-beams were welded. These 400-lb plate pallets have sufficient space between the beams

(*Please turn to Page* 144)

*Fig. 1—Steel pallets loaded with empty kegs are tiered in the warehouse. (Insert)—Closeup showing construction of pallet and use of I-beam in stacking*

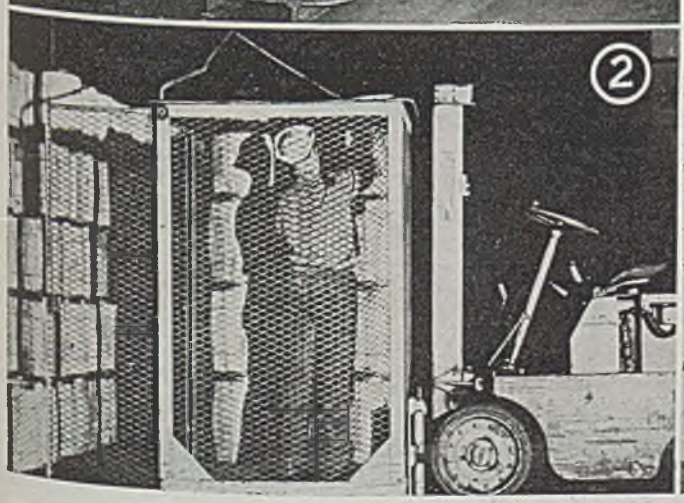


*Fig. 2—Unloading keg cage at end of a run*

*Fig. 3—Specially built keg cage with load of empties is ready to be transported to production line*

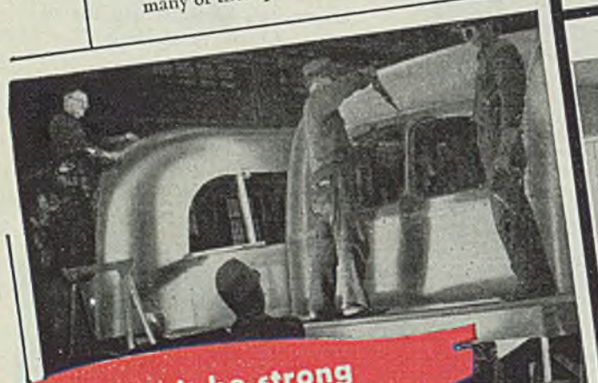
# What does your product need to make it easier to sell?

## Must it withstand high temperatures?

In U·S·S Stainless and Heat Resisting Steels the designer has at his command a complete line of steels especially developed to retain strength at high temperatures. Some can safely withstand temperatures up to 2100°F. Readily formed and welded, they resist corrosion, produce no harmful oxidation scale even at airplane engine exhaust temperatures. U·S·S Chromium and Chrome Nickel Steels have outstanding ability to resist wear and cavitation resulting from contact with grit, turbulent vapors, etc. Designers of chemical engineering, refinery equipment, of steam and gas turbines, will find in these steels the answer to many of their problems.

## Does it need resistance to corrosion?

Tanks and ductwork, metal cabinets, refrigerating, ventilating and air conditioning equipment, etc., that are prone to rust can be built to last longer by using U·S·S Copper Steel. Costing only 5% more than plain steel, it offers double the resistance to atmospheric corrosion. When even greater resistance to atmospheric corrosion is needed, U·S·S Cor-Ten will provide it at reasonable cost, and will also provide 50% higher yield point. And where corrosive conditions of any type are especially severe, U·S·S Stainless Steel will give resistance unsurpassed by any other commercial metal.



## Must it be strong yet light in weight?

Used in buses, trolley coaches, trucks and trailers, in freight and passenger cars, and in fact in all kinds of mobile equipment, U·S·S Cor-Ten—the pioneer low-alloy, high-strength steel—will trim off hundreds of pounds of dead weight, yet at the same time will provide increased structural strength and ruggedness. U·S·S Cor-Ten costs so little more than plain steel and fabricates so readily that these benefits can be obtained at little or no increase in cost. When the ultimate in weight reduction is desired, and its higher cost is justified, U·S·S Stainless Steel will permit even more drastic savings in weight.

## Are good looks important?

In household equipment of all kinds—refrigerators, stoves, washing machines, etc.—porcelain enamel on steel adds beauty, cleanliness and the ability to stay new that women appreciate. Its resistance to chemical action, to moisture, and heat are added advantages that recommend its use in food plant equipment, in bakery and dairy apparatus, and for shower and toilet partitions and wall panels. U·S·S Vitr-enamel is an improved steel base for porcelain enameling that insures maximum life and permanent good looks. In knives, table tops, kitchen sinks, in pots and pans and electrical appliances U·S·S Stainless Steel combines irresistable eye-appeal with unmatched durability.

## Does it need greater ruggedness?

In heavy duty equipment like this, U·S·S High Strength Steels—such as U·S·S Cor-Ten and U·S·S Man-Ten—used in structural members and body plates will provide stamina with the least increase in cost. In gears, axles and bearings where stress is concentrated, U·S·S Carilloy Steels will provide maximum endurance with minimum weight. No other manufacturer of alloy steels can offer you such a complete range of form, dimension and treatment.

## Must it resist severe abrasion?

Especially developed to prolong life wherever grinding, scraping and gritty conditions tend to wear out most materials in short order, U·S·S Abrasion Resisting Steel offers low cost, ideal construction for the wearing parts of mine equipment, ditching machinery, dredges, grinding mills and quarry equipment. In the screen plates of this placer mining dredge screen, U·S·S Abrasion Resisting Steel withstands abrasive wear of the severest kind. In terms of longer service and lower-cost-per-yard it has proved the most economical construction ever used.

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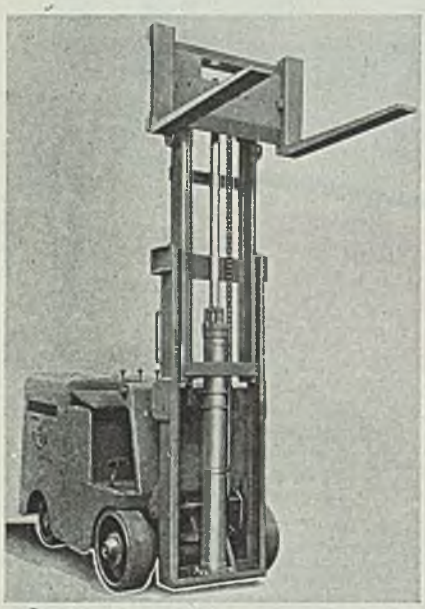
**UNITED STATES STEEL**

# INDUSTRIAL EQUIPMENT

## Fork Truck

A fork truck called Palletier is offered by Crescent Truck Co., Lebanon, Pa. Officially designated model MGVH, it is available in two capacities — MGVH-3, with maximum load rating of 3000 lb, and MGVH-4, rated at 4000 lb capacity.

Frame of unit is completely welded, designed to eliminate all unnecessary counterweighting. Elevating uprights are made of high-carbon pressed steel



channels, heat treated for added strength. Carriage rollers are mounted on 10 Torrington needle bearings and spaced to provide maximum rigidity in the extreme high position. Hydraulic hoist assures fast, positive lifting. Forks are made of hand-forged, high-carbon steel and are adjustable for width and may be reversed on carriage to provide extra 24 in. of lift. Forks have initial lift of 26 in. without increasing overall height of truck. For hoisting, boom tilts forward 5°; normal maximum lift is 108 in., but 132 in. is possible if forks are inverted.

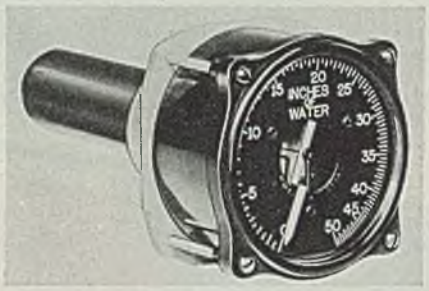
Power axle is a double-reduction spiral bevel to helical gear unit and gears are drop forged special alloy, ground, lapped, matched and mounted on splined shafts and Timken bearings—construction resulting in great strength and completely silent operation. Full floating, one-piece combination driving axle and driving disk are bolted to wheels with tapered flange, alloy steel bolts. Wheels are mounted on dual Timken roller bearings. Differential is the extra-heavy four-pinion type and operates in oil bath.

Motor is specially wound for 30 to 36 v operation, with greatest efficiency at 32 v, the recommended battery size.

*Steel* 3/11/46; *Item No.* 9998

## Gas Pressure Determinator

For the rapid determination of the gas pressure created by molding sand or cores, a portable gas pressure determinator has been developed by Harry W. Dietert Co., 9330 Roselawn avenue,




Detroit 4. This determinator uses a 1⅛ x 3 in. sand or core specimen which is attached to the stem of the determinator. The specimen is then immersed in molten metal. The pressure of the gas envelope created by the specimen is shown on the gage of the determinator. Device makes it possible to measure the pressure of the mold-metal interface gas envelope by a practical method that simulates mold conditions almost perfectly.

Net weight of the unit is 5 lb and the shipping weight is approximately 15 lb.

*Steel* 3/11/46; *Item No.* 9072

## Screw Pumps

Quimby Pump Co., division of H. K. Porter Co. Inc., Pittsburgh, announces

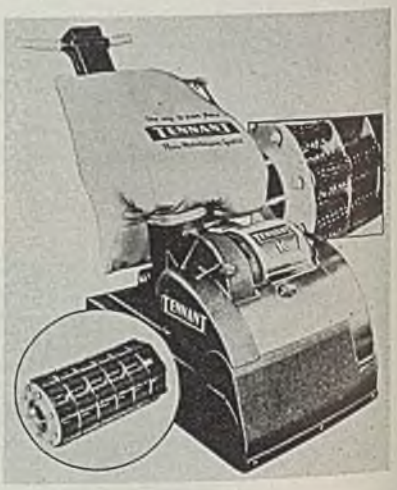
new developments in its balanced quadruplicate screw pump.

Improvements are demonstrated by the new external bearing pump designed with bracket type antifriction thrust and line bearings. Separate pedestals with three-point alignment problem and spacing washers are eliminated, providing free expansion of shafts for wide changes in temperatures. Precision preloaded antifriction bearings permit close running clearance between body bores and screws. Designed for pumping various viscous liquids such as Bunker C fuel oil, tar, rayon dope, molasses, soap liquids, etc., pump is also used in handling thin liquids such as water, alcohol, and commercial solvents of various types.

*Steel* 3/11/46; *Item No.* 9039

## Floor Cleaner

For removing hardened grease, dirt, pitch, tar, dried paint, cement splashes and other extra-heavy soilage from heavy traffic industrial floors, G. H. Tennant Co., 2530 Second street, N., Minneapolis 11,




has developed a special 6 hp gasoline or electric self-propelling floor machine equipped with a heavy drum-mounted rotary cutter attachment. This device revolves at 1750 rpm and has a hammer mill pulverizing and chipping action that shears incrusted grime from floors at a faster rate (per pound of soilage) than any other method yet devised. Soilage is picked up at the same time. Only one operation is required.

Cutter attachment, known as the Revo-tool, consists of a heavy steel open-type drum housing with approximately 350 alloy steel cutters mounted in horizontal rows along the drum's circumference. Each cutter has 18 teeth and rotates freely on a hardened steel shaft.

As drum revolves at high speed the cutters contact the floor at the rate of approximately 10,000 times per second. Centrifugal motion of revolving drum hurls heavy soilage into built-in hopper of floor machine while a powerful vacuum system draws lighter material into heavy fabric bag.

This machine also removes unsound sections of wood or concrete floors in

*(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 126.)*

# 17 ADVANTAGES

FOR YOU IN REPUBLIC'S NEW

# Shankless* Drill

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• A better, tougher, longer-lasting drill at a lower price—what more could you say about a twist drill? Yet that is only a small part of the story of Republic's new "Shankless" drill. There are actually 17 money-saving and operating advantages of this new kind of drill. And they've been proved on the production lines of many of the largest, most progressive manufacturers. If you are a user of twist drills, Republic can show you a way to cut production costs. Send for this book, which tells a real economy and performance story.

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Republic Drill & Tool Co., S-3
322 South Green Street
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Please send me a copy of your new Manual which gives the complete story of Republic's "Shankless" drills.

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# Republic DRILL & TOOL COMPANY

CHICAGO 7, ILLINOIS

BOSTON • NEW YORK PHILADELPHIA • PITTSBURGH • CLEVELAND • DETROIT • DAYTON • BIRMINGHAM • LOS ANGELES • SAN FRANCISCO

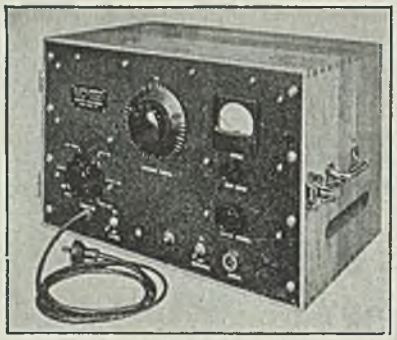
WORLD'S LARGEST EXCLUSIVE MANUFACTURER OF TWIST DRILLS

floor-laying operations and levels concrete slabs prior to application of mastic, cement or other material.

*Steel* 3/11/46; *Item No.* 9066

## Signal Generator

A new precision-built, high-level r-f signal generator covering the range from 400 kc to 60 mc in six steps is announced by Barker & Williamson, 235 Fairfield avenue, Upper Darby, Pa. Modulation of 30 per cent at 1000 CPS is optional by means of a panel switch. Output is 3 v (RMS) at all frequencies and is read directly from a panel voltmeter. Output is through an output jack and coaxial



cable terminated in a 75 ohm resistive load. Calibration is accurate to better than ½ of 1 per cent and is read from a large individual calibrated chart mounted on the lid of each cabinet. Six ranges are as follows: 400 kc — 1000 kc; 1000 kc — 2500 kc; 2500 kc — 6 mc; 6 mc — 13 mc; 13 mc — 28 mc; 28 mc —60 mc.

*Steel* 3/11/46; *Item No.* 9057

## Gas Recorder-Controller

An automatic analyzer and recorder for indicating, recording and controlling the combustibles content of a gaseous mixture, has been developed by the Bailey Meter Co., Cleveland 10. This instrument is said to have been successfully applied to precision control of furnace atmospheres and chemical processes, as well as combustibles measurements in the petroleum, metallurgical, automotive, and chemical industries.

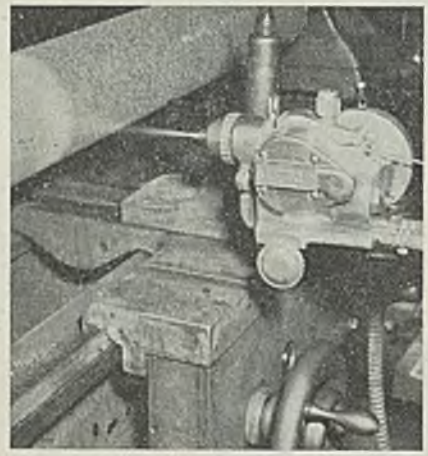
The analyzer and recorder provide a continuous graphic analysis almost instantly, and is responsive to changes of 0.05 per cent combustibles. Sustained accuracy is said to be within 0.25 per cent. Pneumatic control or electric alarm contacts may be provided on both one and two-pen recorders. A two-pen recorder utilizes separate analyzers so that the speed is not impaired by switching, and the two records are independent of each other.

A continuous gas sample is mixed with compressed air and burned on a catalyst-filament which reaches a temperature proportional to the combustibles content. Since the filament resistance is a function of temperature, a simple resistance bridge connected to a null-balance electronic recorder completes the installation. It may be calibrated in per cent combustibles, mixture ratio, or other desired terms. Variable fuel quality does not affect the accuracy of control.

*Steel* 2/11/46; *Item No.* 9917

## Metallizing Gun

Metallizing Engineering Co. Inc., 38-14 30th street, Long Island City 1, N. Y., announces a new metallizing gun designed for heavy-duty, continuous operation. Known as the Metco Type Y metallizing gun its general construction, performance and other features are



geared for mounted, mechanical operation, rather than for hand use. Its features include the use of 3/16-in. wire, which, when combined with an acetylene pressure of only 15 psi more than doubles previous spraying speeds. Fluid lubrication and a built-in forced feed pump which has no parts to wear assures an adequate supply of lubricant to all bearings regardless of operation position. The gun is nonsensitive to gas and oxygen pressure variations as much as 10 lb either while lighting or while spraying.

*Steel* 3/11/46; *Item No.* 9064

## Hermetically-Sealed Resistor

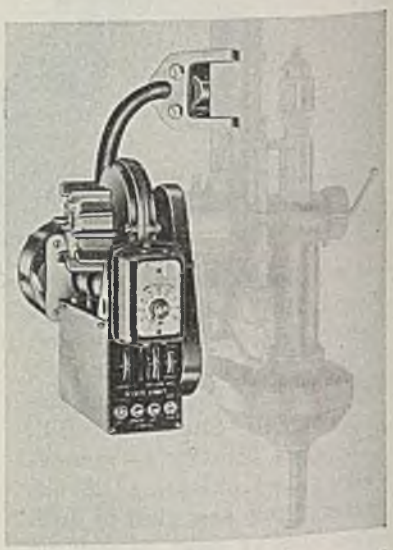
A new small-size unit rated at 0.5 w and 7/8 in. long by 7/8 in. in diameter is offered by Shallcross Mfg. Co., Jackson and Pusey avenues., Collingdale, Pa. Known as Type 1101, the resistor is designed for style RB12A under JAN Specification R93. Maximum resistance value when wound with nickel chromium wire is 350,000 ohms, maximum voltage 420 v. Resistance element, winding form and protective ceramic shell form an integral unit. No internal leads or "floating" wires are used, and hermetic-sealing is obtained without use of ferrule caps or glass drawing by a special solder process.

*Steel* 3/11/46; *Item No.* 9073

## Power Feed

Pre-selectric power feed introduced by James H. Knapp Co., 4921 Loma Vista avenue, Los Angeles, automatically duplicates the operations of a skilled mechanic when deep drilling or tapping small holes, providing automatic chip clearance at preselected depths during drilling or tapping operation.

The device mounts by a bracket or drill press column and by attaching a collet to the drill press spindle feed shaft. Positioning of power feed is not critical, being governed by the alignment of the collet with the spindle feed shaft. Weight of unit is balanced on its support arm, no weight being added to the drill press spindle feed shaft bearings. The feed will consistently drill 50 holes through



alloy steel plate to the full length of the drill without drill breakage and with substantially less dulling of the drill than when controlled by hand. All controls on the device are available to the operator from normal position in front of the drill press.

In operation the power feed provides timed, reversible, adjustable torque with automatic start of the cycle and automatic stop. When used with any standard tapping head, unit becomes a precision automatic tapper. Tap is lifted high enough for chip clearance, but not completely removed, which is of particular advantage in blind tapping when a chip driver ahead of tap is a disadvantage. Unit is also used for honing, lapping and

*(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 126.)*

# *Announcing*

## TWO NEW SERIES OF MUREX ELECTRODES

### ...For All-Position Welding of High-Strength Steels

One of the most important welding developments in recent years, the new Murex line provides two complete series of chrome-moly electrodes especially suited for all-position welding of power plant piping and equipment as well as a variety of applications involving high tensile strength steels.

The graduated alloying contents of chromium and molybdenum give these electrodes a wide range of well-balanced mechanical properties. Thus it is possible to select weld metal similar in strength and ductility to many high tensile steels. The eight electrodes, listed at right, comprise the two groups.

| | MUREX TYPE | AWS Grade |
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| ...for use on direct current with reverse polarity. | 1110 | E7010 |
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| ...for use on alternating current or direct current with either polarity. | 1113 | E7013 |
| | 2113 | E8013 |
| | 4113 | E9013 |
| | 4213 | E10013 |

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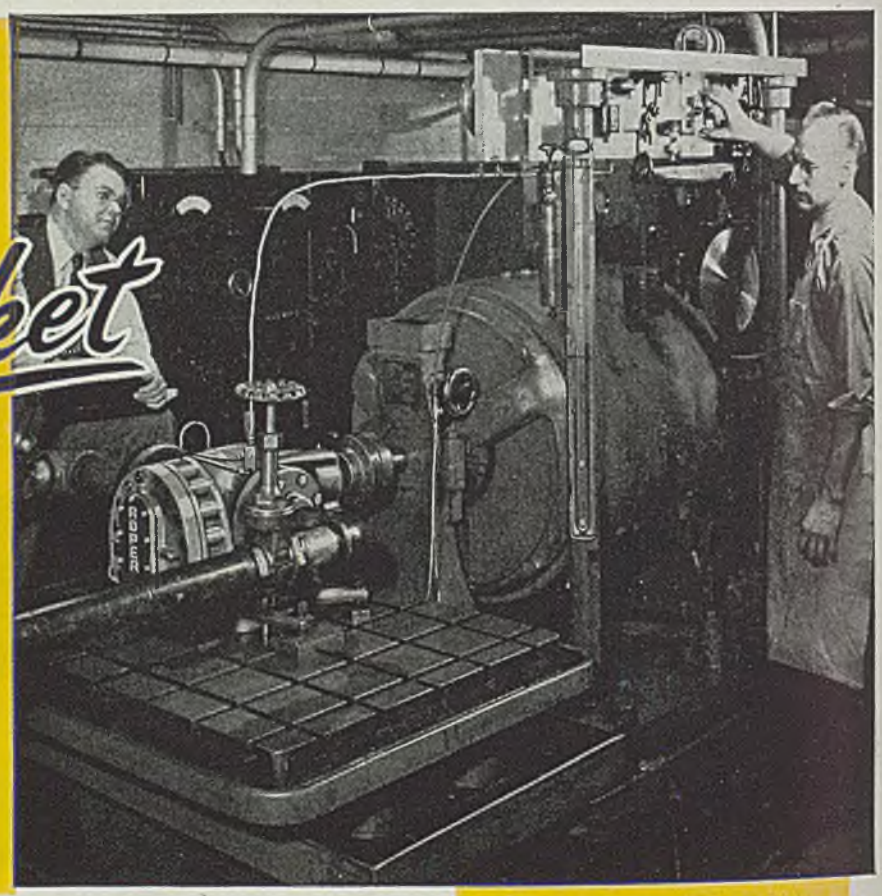
# MUREX ELECTRODES

# Your test-ticket

## PUMP PROVING GROUND WORKS FOR YOU AT ROPER

Here on a dynamometer test block, a Roper 75 g.p.m. pump is put through its paces. With modern test facilities its performance is accurately measured, and results are predetermined. It is a painstaking procedure that is followed out at Roper to prove each pump.

Yes, prior to shipment, each Roper is given a rigid, individual horsepower and capacity test. And the test standards set up to meet requirements are recorded on the "test-ticket" which you receive with each pump. It's your insurance against faulty performance and costly time losses. For standard as well as for special engineered units, the proving ground works for you at Roper.


### Proved Roper Features that Insure Dependable Service

Continuous bearing lubrication . . Axial hydraulic balance . . . Floating equal size external gears . . . Oversize bearings, gears supported at both ends . . . Efficient operation in either direction . . . Can be serviced without disturbing pipe connections, power unit or pump mounting . . . Packed box or mechanical seal units to suit requirements.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Illustrating and describing pumps built to handle pressures up to 1000 lbs. p.s.i., capacities ¾ to 300 g.p.m. at speeds up to 1800 r.p.m. Lists service and engineering offices in principal cities.

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MOTOR UNITS

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BUILDERS OF PUMPS FOR MANUFACTURING, MARINE, PETROLEUM, AND PROCESS INDUSTRIES

reaming. It permits hopper-feed of work to drilling fixture with operating cycle controlled by energizing a circuit through the power feed to assure proper positioning of the work, with electrical interlock.

*Steel* 3/11/46; *Item No.* 9860

## Precision Lathe

Hardinge Brothers Inc., Elmira, N. Y., has announced model DV59 high-speed precision lathe for tool rooms, laboratories and production departments working to extremely close tolerances and finish specifications. It incorporates the following features:

Steel bed ways are of improved dovetail design, hardened and ground to master gages to assure sustained accuracy and precision interchangeability of attachments. Dovetail bed ways form a solid

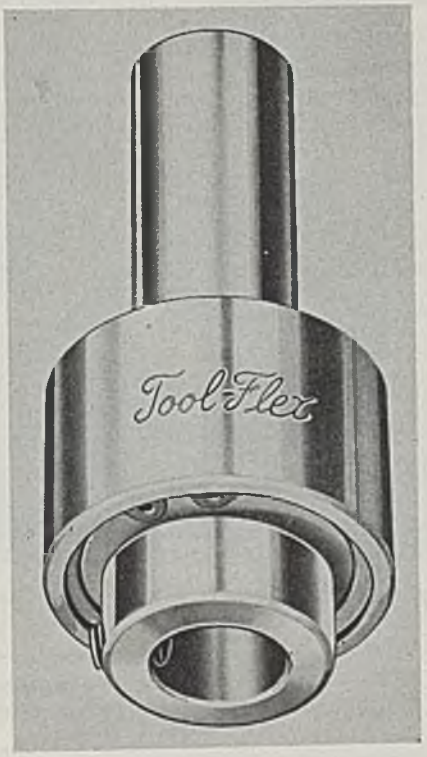
bed top. Design protects accurate angular way surfaces from falling chips and foreign matter. Lathe bed has three-point mounting on welded steel pedestal base, to insure original bed accuracy even when machine is placed on uneven floor. Fully enclosed headstock has preloaded ball bearing spindle construction. Spindle is ground to take standard 1 in. capacity 5C Hardinge collets and 6 in. capacity step chucks. Spindle nose is supplied with either standard taper nose or standard threaded nose for direct application of step chuck closers, jaw chucks and face plates. Headstock spindle is driven by a center-drive belt. Center drive construction places the belt between spindle bearings for balanced bearing spread and equal distribution of belt pull.

Ball-thrust tailstock spindle has constant full bearing regardless of position in the tailstock body. Latter has mating dovetail section to securely anchor tailstock to ways. Welded steel pedestal base fully encloses driving unit and tool storage compartment. Electrical equipment is built into machine, providing magnetic control with start and stop pushbutton operating on 110 v, and has time-lag thermal overload relays providing overload and low voltage protection.

*Steel* 3/11/46; *Item No.* 9988

## Flexible Tool Holder

The new model B Tool-Flex, the flexible tool holder that floats in oil resistant neoprene, is recommended for use on follow-up work on turrets of automatic




or hand screw machines, engine lathes, drill presses, and larger multiple screw machines.

It is self aligning, due to its construction. Tools are always centered when tapping, reaming, honing, and counterboring. It saves set-up time, cuts cost due to tool breakage, and eliminates scrap throw outs.

Device is manufactured by Burg Tool Mfg. Co., 6709 South San Pedro street, Los Angeles 3.

*Steel* 3/11/46; *Item No.* 9038

## Magnifying Lens

Super Sight for industrial first aid and laboratory purposes, is offered by Boyer-Campbell Co., Safety Division, 6540 St. Antoine, Detroit 2. It provides magnification and light instantly where you want it as it is a magnifying lens and light en-unit that can be moved around with finger-tip control, remaining in whatever position you place it. It is used for first aid in industry for the removal of foreign bodies from eyes, of splinters from fingers for drilling surgery, tendon repair, suturing, puncture wounds, eye treatments, etc. It comes in two models equipped with clamp or floor stand base, in either white or statuary bronze finish. Lenses are either 4 or 5 in. in diameter. Clamp type permits mounting to chair, table or wall. Stand makes it a portable unit. Head is balanced to bracket and can be moved in any direction.

*Steel* 3/11/46; *Item No.* 9065

## Electronic Counter

An improved two-decade electronic high-speed counter, designed to fill the need in fields unable to employ conventional mechanical counters, is announced by Potter Instrument Co., 136-56 Roosevelt avenue, Flushing, N. Y. This unit is particularly applicable for counts exceeding 10 cycles per second, and in installations where mechanical counters would wear out prematurely because of the high-speed continuous operation.

Used alone as a two-decade instrument, maximum count capacity of the

electronic counter is 100. A tube-operated relay is provided for cases where the quantity to be counted exceeds 100. Relay has a single-pole, double-throw contact which is brought out to terminals on the front panel of the unit, and operates once for each 100 counts.

An electro-mechanical counter may be connected in series with these terminals and an appropriate external power source such as the alternating current line. Each 100 counts of the electronic counter will then cause one operation of the electro-mechanical counter.

When operation of relay and an external mechanical counter are not involved in the application of the two-decade electronic counter, it may be used alone, at counting rates up to 20,000 per second.

The instrument comprises an input section, suitable for any of the four enumerated types of input circuits: Contact closure, pulse signals, sine-wave signals, square-wave signals.

It also consists of two standard counter-decades, designated respectively as the "units decade" and the "tens decade",

*(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 126.)*

an output relay stage, and a power supply.

The unit is complete with power supply, and is ready for operation from a nominal 115 v, 60 cycle, alternating power line. No special types nor special selection of vacuum tubes are required for the counter's 12-tube complement.

*Steel* 3/11/46; *Item No.* 9006

## Speed Chuck

A new air operated collet-type speed chuck is announced by Erickson Tools, division of Erickson Steel Co., 2309 Hamilton avenue, Cleveland. It delivers guaranteed accuracy over a collapsibility range of 1/32-in. It incorporates the Erickson holding principles of accurate mating of angles of chuck shank and collet to deliver great accuracy and gripping power.

Available in either foot valve or hand operated models, and adaptable to any spindle, Model 4AT range is ⅛ to 1 in. Model 6AT range is 1 to 2 in.

*Steel* 3/11/46; *Item No.* 9061

## Fire Extinguisher

A new carbon dioxide hand fire extinguisher developed during the war is announced by B. F. Goodrich Co., Akron, O.

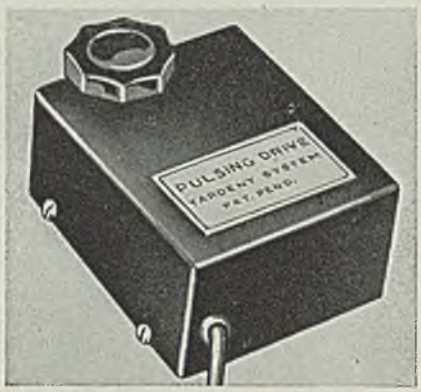
Made to meet the full approval of fire underwriters, the container holds 4 lb of carbon dioxide and comes with a carrying handle and control button designed for fast operation. It can be carried in one hand, with the thumb of the carrying hand operating the pushbutton. A horn swivel quickly raises or lowers as needed, remaining in lower position when attached to the wall rack furnished with each extinguisher, together with a quick release chain.

Painted orange and black for high visibility, the extinguisher may be recharged at regular refill service establishments.

*Steel* 3/11/46; *Item* No. 9074

## Pulsing Control Drive

Pulsing drive offered by Yardeny Engineering Co., 105 Chamber street, New York 7, provides single knob precision control of any type of reversible motor. Direction and extent of motor motion are under complete control of the single knob. Motor may be continuously rotated or moved in small increments—




easily and accurately. Control action is as follows:

Slow clockwise rotation of the control knob results in a corresponding motor motion in small increments. Slow counterclockwise rotation of the control knob causes reverse motor rotation in small increments. Either of the above operations permits the controlled mechanism to be spotted with the highest degree of accuracy.

By depressing the knob and turning the knob slightly right or left continuous forward or reverse rotation of the motor can be accomplished.

The drive works on all standard currents and frequencies. The extent of fine and coarse control provided by the unit can be made to suit every purpose in a manner that permits quick approach and positioning of the controlled object.

It is suitable for inclusion in all existing controlled motor devices. Recommended applications include precision control of valves, flaps, radio tuning elements, cranes, lifts, rollers, presses, machine tools, mixers, etc., in fact any motor-driven equipment requiring more precise and more flexible control than is afforded by ordinary pushbutton methods of control.

*Steel* 3/11/46; *Item No.* 9068

## Parts Cleaning Machine

A portable type parts cleaning machine, which utilizes air pressure to agitate the cleaning fluid, has been announced by the Park Chemical Co., 8074 Military avenue, Detroit 4.

Two systems of cleaning are combined in the one unit. Large parts to be cleaned are placed in the tank and the cleaning solution is agitated by means of air pressure which is dispelled from a series of holes in a pipe located along the length of the tank bottom. Small parts such as screws, washers, etc., are placed in the round basket and soaked in the solution for a few minutes. The basket can be revolved or swished by hand. After parts have been cleaned, rack is placed on an attached drain-shelf which drains the solution back into the tank for re-use. Parts are then blown dry by means of the air gun and rinsed with water or petroleum spirits.

*Steel* 3/11/46; *Item No.* 9908

**FOR MORE INFORMATION** on the new products and equipment mentioned in this section, fill in this form and return to us. It will receive prompt attention.

*Circle numbers below corresponding to those of items in which you are interested:*

| | | |
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| 9998 | 9064 | 9006 |
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| 9039 | 9860 | 9074 |
| 9066 | 9988 | 9068 |
| 9057 | 9038 | 9908 |
| 9917 | 9065 | |
| | 3-11-46 | |

NAME ..... TITLE .....

COMPANY .....

PRODUCTS MADE .....

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**Mail to: STEEL, Engineering Dept.—1213 West Third St., Cleveland 13, Ohio**

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# 2 drafting room techniques

## *that save time, labor, and dollars in the office!*

**Ever stop** to think why a Draftsman *always* draws on translucent paper?

It's done so that reproductions can be made quickly in an Ozalid machine, or in blueprint or similar equipment.

In these units, light rays penetrate the original, exposing sensitized paper beneath. Then, the print is developed.

Opaque originals cannot be reproduced in this economical manner. They must be copied photographically—and, by comparison with OZALID'S unique Dry-Development, this takes 65 times as long! And you receive only a negative—not a positive!

No wonder leading companies have changed to translucent forms . . . so that Ozalid could be utilized in all departments as well as in the Drafting Room!

**1. Use translucent paper for office forms, reports, stationery.**

Then, whenever you want reproductions, you can get POSITIVE OZALID PRINTS IN AS LITTLE AS 9 SECONDS!

Besides being the fastest technical reproduction process, OZALID IS THE MOST VERSATILE—allowing you to make 10 different types of prints; in different colors—black, blue, maroon, or sepia; and on different materials—paper, cloth, foil, or film.

Each type of OZALID PRINT has its advantages—you use the one best suited for the job at hand.

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A positive film "MASTER" can be made from *any* opaque original in the usual photographic steps. This is used to turn out subsequent OZALID prints in seconds, at negligible cost. Then it can be filed away until more prints are needed.

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# OZALID

DIVISION OF GENERAL ANILINE AND FILM CORPORATION
JOHNSON CITY, NEW YORK
Ozalid in Canada—Hughes Owens Co., Ltd., Montreal

## Lathe for Indenting

(*Concluded from Page* 91)

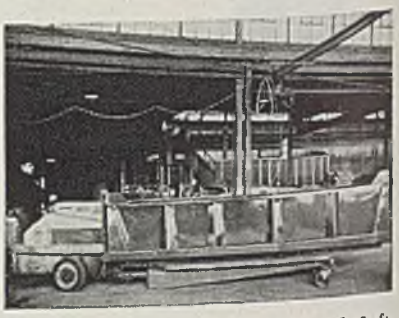
in. long. The babbit is a special alloy adopted by Carnegie-Illinois for extreme heavy duty use. Its composition is as follows:

| | |
|---|---|
| Tin | 87.5% |
| Antimony | 7.5% |
| Copper | 4.5% |
| Nickel | 0.4% |
| Tellurium | 0.1% |

Progress in any art is best measured by the increase in productivity of the individual. Some 20 years ago, when the first "Multi-Grip," diagonal-pattern floor plate was introduced by the Illinois Steel Co., the roll which produced it was "indented" on an old 72 in. lathe with a cam-operated tool slide. It took some 350 hr to "indent" one roll. With the installation in 1939 of the original Simmons roll grooving lathe—an adaptation of an existing boring lathe—this time for grooving a roll with the diagonal pattern was reduced to 120 hr. Today, through use of the highly developed machine described in this article, an operator can completely finish the grooving operation in 60 hr.

## Dolly on Power Truck Transports Long, Heavy Load

Long and heavy objects, such as the dump-truck body shown in accompanying illustration, can be transported readily by means of a two-wheeled dolly and a low-lift platform truck. Body, fabricated by welding steel plates, is approxi-



mately 15 ft long, 3 ft high and 6 ft wide. It is lifted onto the dolly by overhead crane.

Dolly is made from steel plate, with sides shaped and turned down. Forward end is mounted on wheels and rear end rests on floor. Upper surface of dolly is practically at uniform level, at a height making it easy for truck's platform to be pushed underneath it.

By lifting the rear end of the dolly off the floor, the entire load is supported on wheels, four on the industrial truck and two on the dolly. In this position this and similar loads may be moved anywhere in plant, or transported to stockroom or shipping platform, according to Elwell-Parker Electric Co., Cleveland.


*All operating functions, including adjustable-speeds are provided from plant's A-c. circuit on this Waterbury-Farrel Wire Draw Bench by a 5 Hp. Reliance V★S Drive.*

In the North Chicago plant of the Fansteel Metallurgical Corporation there is a draw bench which processes wire for many unusual purposes from such "story book" metals as tantalum, tungsten and molybdenum. And, because of the need for widely varied speeds under constant and absolute control, the Reliance V★S Drive has proved a "natural" for these delicate operations.

With V★S—an *all-electric, adjustable-speed drive operating from A-c. circuits*—unlimited speed variation with absolutely smooth acceleration and deceleration and automatic maintenance of proper tension are available. Automatic reversal can be provided at any desired point. Starting, stopping and speed changes are controlled from either nearby or remote stations.

Write for Bulletin 311, or call the nearest Reliance office for information about Reliance V★S Drive which may suggest how you can use it profitably in your own production operations, or in designing new production machinery.

**See the Operating Exhibit of the Reliance V★S Drive at the American Society of Tool Engineers Exposition • Cleveland, April 8-12**

## RELIANCE ELECTRIC & ENGINEERING CO.

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**"MOTOR-DRIVE IS MORE THAN POWER"**

## Aluminum Sheet

(*Continued from Page* 93)

hot rolling is the 4-high reversing mill. In the 4-high mill, only the work rolls, or the two smaller center rolls, are power-driven. The back-up rolls are driven by friction with the work rolls. Strong alloys of the dural type require a great amount of pressure in rolling.

The main disadvantage in the 2-high mill lies in the fact that when this pressure is applied, the rolls will deform or bend in their centers. In the 4-high mill, this spring-back is overcome by the use of the heavy back-up rolls.

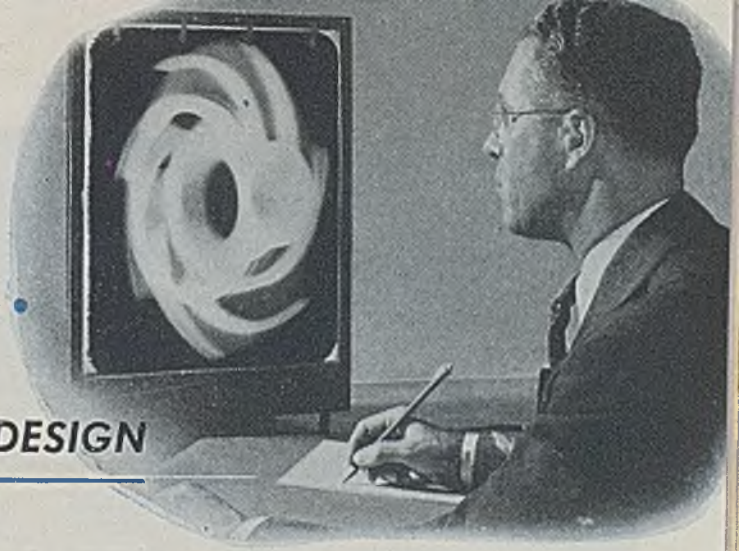
Hot rolling is supplemented by tandem arrangements of mills operating in one direction. Prior to the war these units consisted of 2-high hot continuous mills; however, today they have generally been replaced by the more modern 4-high continuous hot mills, consisting of fewer stands. It is usual practice to widen and roll to approximately 1 in. thick on the reversing hot mill, then enter the hot continuous mill and emerge at approximately ⅛-in. thick and then coil.

**Cold Rolling Procedures:** In cold rolling, the first operation consists of "roughing"—rolling the annealed hot mill coil to an intermediate gage prior to annealing again. This intermediate gage is selected, if possible, so that after annealing, the second operation or finish rolling will give the finished gage desired.

Under ideal conditions the rolling of any particular gage and width of metal would be accomplished by a specially ground and shaped set of rolls. However, because of the multiplicity of gages and widths that are required, this type of procedure would be impracticable. In practice, the control of roll shape in cold rolling is by use of a coolant. The lubricant used must have a high film strength; when it covers the sheet in the form of a film, this film must be capable of withstanding the pressure exerted upon it by the rolls during the reduction so that there is no contact between the roll and the sheet. If the film is broken, the rolling operation will produce a herringbone pattern on the sheet which is undesirable from the standpoint of appearance and acceptability.

It is also important to maintain clean rolls as well as to control the shape to which the roll is ground. There are numerous difficulties which may be encountered in cold strip rolling. One difficulty is the tendency of strip to edge crack so that when the guides leading to the work rolls are encountered by the strip, small pieces of metal are broken off and rolled into the sheet. If an improper roll shape is used, the center of the sheet may be rolled to a thinner gage than the edge and a wrinkle or buckle formed. The difficulty may occur at

# Today, more than ever, radiography pays off...



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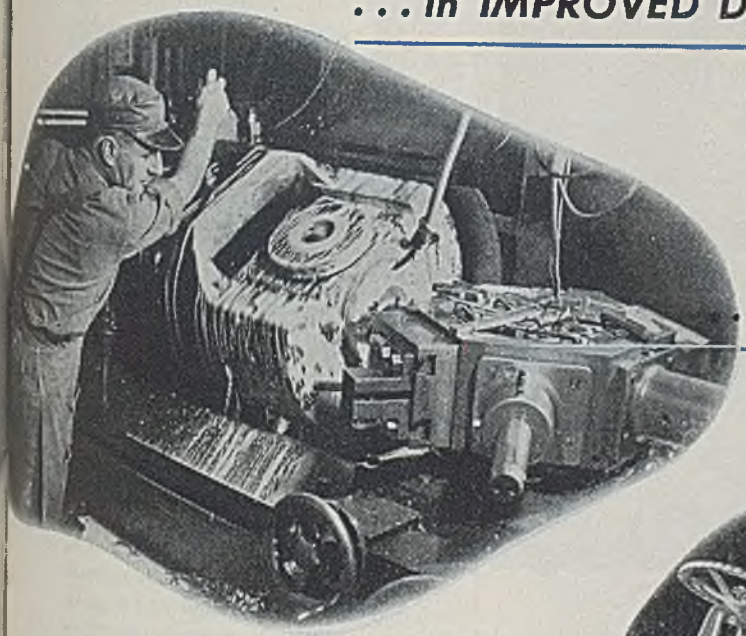
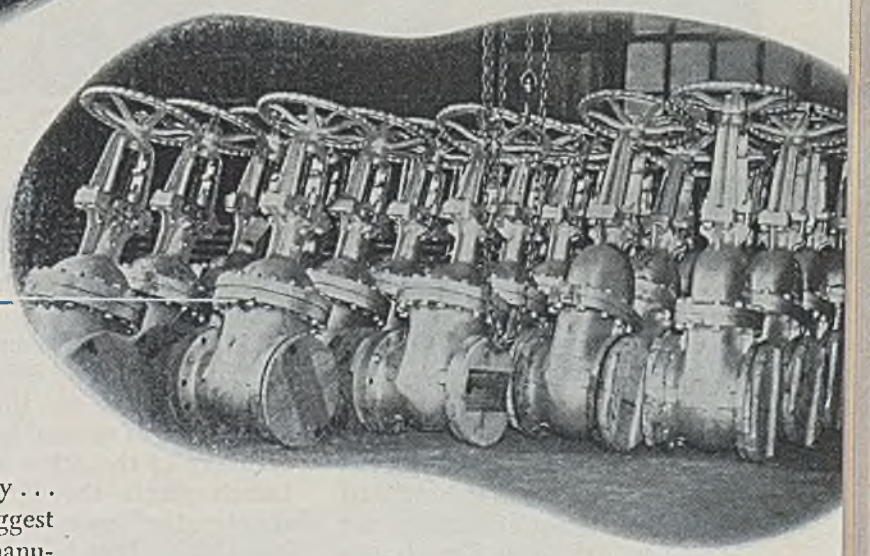


## . . . FASTER, SOUNDER PRODUCTION



## . . . LOWERED COSTS

RADIOGRAPHS show your designers how to simplify . . . how to reduce weight safely . . . where to suggest improved processes . . . how to start a cycle of manufacturing economies that will lower unit costs.

Rush-order foundry production takes a welcome spurt when pilot radiography quickly shows how to correct casting technics . . . and get a higher percentage of sound castings per melt. Recent examples: radiography cut foundry rejects on a gear blank from 14% to 1.2%; on a shaft housing, from 40% to 5%.

There's no waste of machining time when radiographs keep internally unsound castings out of the shop. Recent examples: in one plant, x-rays cut wasted machining time from 33⅓% down to 2%; in another, from 90% to 5%; saved a third $50,000 a year.

The final pay-off comes when you check the figures . . . when you balance the relatively small cost of your x-ray operations against the large dollars and cents value of improved design, increased production, lowered manufacturing costs, eliminated waste, and greater customer satisfaction.

Why not look around your own plant today . . . check your costs . . . see if you are taking full advantage of what radiography can do? Your x-ray dealer will be glad to help. Or write to

**Eastman Kodak Company, X-Ray Division**
**Rochester 4, New York**

# Radiography

**. . . another important function of photography**

Kodak

any point across the sheet if the roll shape is not properly controlled.

After the hot mill coil has been cold rolled and annealed, as much as 90 per cent reduction can be made on 3S and 2S before it is necessary to anneal again, whereas reductions on the stronger alloys such as 24S are much lower, between 60 and 70 per cent. The amount of cold reduction is largely dependent upon the rate at which the metal hardens with cold work. Some alloys harden at a rather rapid rate when cold worked and often present difficulty.

**Cold Rolling Mills:** It is possible to trace the development of cold rolling in a fashion similar to the development of hot rolling. Flat sheet rolling, which is very similar to hot rolling on the 2-high unidirectional mill, is rapidly becoming obsolete. Because of the pressures required in reducing the strong alloys, as mentioned previously, there is considerable spring in cold rolling flat sheet on 2-high mills. This produces a sheet several thousandths of an inch thicker in the center than at the edges. This may be controlled to a certain extent by the shape to which the roll is ground. This shape is somewhat like a barrel, the diameter at the center being greater than the diameter at the end of the roll by from 0.002 to 0.014-in. This is generally referred to as being ground with a crown. Flat sheet rolling is generally carried out with a train drive—a series of 2-high mills all of which are driven by the same motor.

The main difficulty in cold rolling on the 2-high is that the reduction per pass must be so small. To give some flexibility to the 2-high mill, sectional buffs are used. These buffs are so adjusted that they may be tightened to vary the pressure at regular intervals along the length of the roll, and thus heat any given section of the roll by frictional heat causing the metal in the roll to expand so that an additional control over the roll shape is achieved.

The first development from the 2-high unidirectional cold mill was the 2-high strip mill, single stand. The only difference in this case was that a cradle for unwinding the coil was provided on the entry side, in combination with suitable rewinding equipment on the exit side of the mill. Thus it was made possible to roll long strips of sheet. This operation generally was confined to narrow widths.

The next development in cold rolling was the 4-high mill. This has been so successful that the use of the single stand 4-high mill in the rolling of aluminum has become quite general.

The next type cold mill developed was the 2-stand 4-high. The 2-stand mill is simply two single stands placed in tandem arrangement so that by a single pass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of the strip between the work rolls, two separate reductions may be taken. This gives a decided advantage of a higher reduction for a single operation.

**Finishing Operations:** After the coil is rolled to finish gage it is then ready to be converted into the form desired by the customer. The operations required for this vary to some extent depending upon whether the commodity is a common alloy (2S, 3S, 52S) or a strong alloy (24S, 24SPC, RX-301, RX-303, etc.) and also whether it is to be supplied in coil or flat form.

### Common Alloys

**Coil Sheet:** In the case of common alloy coil sheet the coils emerge from the cold mill finish rolled to gage and tempered except for material being produced in the annealed or "0" temper. All coils are transferred to slitting machines which consist essentially of sets of rotary slitting knives mounted in a suitable housing and equipped with unwind and rewind equipment. The slitting knives can be adjusted and set to various widths. For a given order the knives are set to the desired width and the coils are then processed through the slitting machine. In the case of ¼H, ½H, ¾H, and H the slit coils are sent to Inspection and Packing after slitting whereas material in the "0" temper must be annealed after slitting, then sent to inspection.

**Flat Sheet:** Common alloy flat sheet supplied in ¼H, ½H, ¾H, and H tempers is rolled to gage and tempered during the rolling process. The coil at finish gage is then processed through a shear line, which flattens the sheet and shears into predetermined flat sheet lengths. The sheet is flattened by roll leveling or stretching, or a combination of both, then finish sheared to size.

In the case of material finishing in the "0", or annealed temper, the sheet is finish sheared to size in the hard temper, and annealed, before being sent to inspection.

### Strong Alloy

**Coil Sheet:** In the case of strong alloy supplied in coil sheet the coils are finish rolled to gage on the cold mills, processed through the heat treating operations if W or T temper is required and then slit to finish width. Strong alloy coil sheet supplied in the "0" temper is processed in the same fashion as common alloy coil sheet produced in the "0" temper.

**Flat Sheet:** Strong alloy flat sheet is cold rolled to finish gage then given the prescribed heat treatment, after which flattening operations are performed. The sheet is then finish sheared to size and sent to inspection.

Strong alloy flat sheet supplied in the


# Everything Aluminum has to offer . . .

To keep step with today's advancing standards, many more products and product parts are being made as aluminum castings. But not only because of this metal's light weight, its great strength, high corrosion resistance and other well-known superiorities.

Manufacturers want these advantages . . . and more. They seek the alloy proved best for their jobs. They require dimensional accuracy . . . uniformity in structure . . . and every refinement that can be included without functional change. They want closer tolerances and a minimum of machining.

Pioneering Permite engineers and metallurgists — men of 25 years' experience in aluminum techniques and analyses, supported by the Permite modernly equipped foundry — provide these extra essentials. That is why manufacturers of a great variety of products come to Permite with their plans and problems.

Through Permite engineering you, too, can have every advantage aluminum has to offer — in Permite Permanent Mold Aluminum Castings. If you have a parts problem, send blueprint for recommendations of Permite engineers. Of course, there is no obligation to you.

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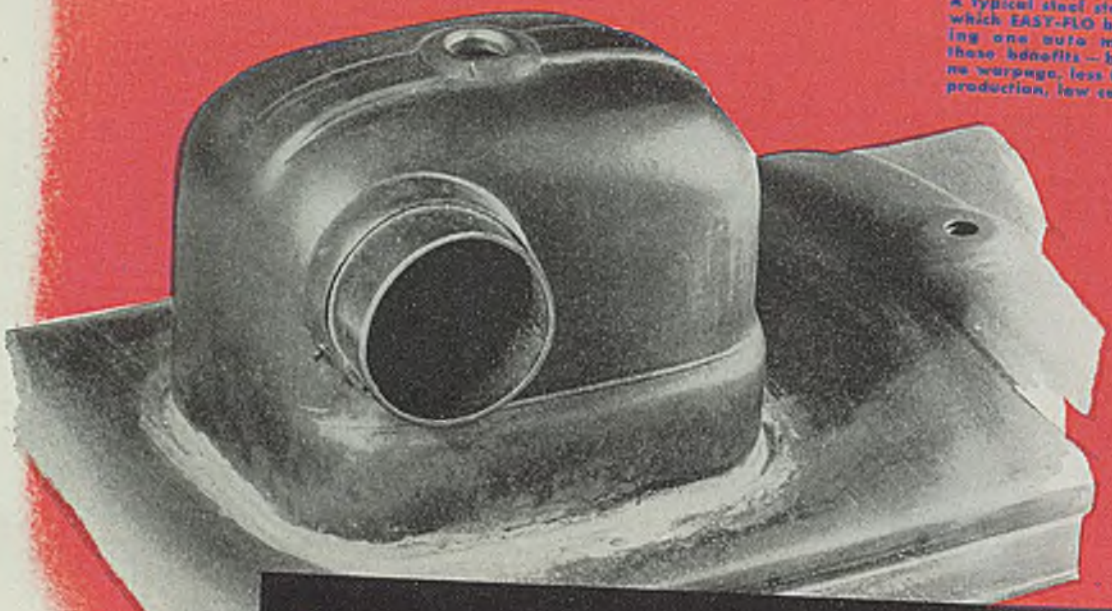
ALUMINUM PERMANENT MOLD, SAND and DIE CASTINGS...HARDENED, GROUND and FORGED STEEL PARTS

# EASY-FLO BRAZING



A typical steel stamping job in which EASY-FLO brazing is giving one auto manufacturer these benefits—high strength, no warpage, less finishing, fast production, low cost.

## keeps pace with the ever-growing use of STAMPINGS

Hundreds of parts and products are now fabricated from stampings and the number is steadily multiplying. As an **ideal method of joining stampings,** EASY-FLO brazing has played a leading part in this development right from the start.

And why is EASY-FLO brazing ideal for joining stampings? Because EASY-FLO makes joints fully equal to the stamping itself in strength, and in ductility to withstand vibration, shock and temperature changes—joints that are liquid and gas tight—joints that offer strong resistance to most corrosive agents. And in the making of these joints EASY-FLO's low temperature makes it easy to protect thin metals from heat damage.

Of equal importance, this combination of properties makes EASY-FLO brazing fast and surprisingly low in cost. With modern heating equipment and production methods, reliable brazed parts are turned out at amazing production rates—and by easily trained operators.

### GET COMPLETE DETAILS IN BULLETIN 12-A

All the EASY-FLO facts mentioned in preceding paragraphs are fully explained in this bulletin. They're important to every designer and manufacturer of metal products. A copy of Bulletin 12-A is yours for the asking. Write for yours today.

ARMY E NAVY

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"0" temper is processed in the same fashion as common alloy flat sheet in the "0" temper.

There are special types of sheet offered the trade such as—Reflector Sheet, Brazing Sheet, Etching Sheet, etc. as well as special finishes such as Mill Finuish One Side Bright, Standard One Side Bright and Standard Two Sides Bright—all of which require special processing.

## Crawler Shovels, Cranes

Four new heavy-duty machines incorporating features developed with aid of wartime engineering experience are available from Thew Shovel Co., Lorain, O. Designated as the Lorain "41" Series, line consists of a chain-drive crawler machine and three rubber-tired machines, one with 4-wheel drive, one with 6-wheel drive and a third self-propelled.

Two-speed, crawler machine features an entirely new mounting that is longer,

wider and heavier. Standard treads are 30 in. in width and travel speeds in either direction are 3/4 and 1 5/8 mph. Steering is done from cab in any swing position of boom.

Four-wheel drive Moto-Crane shown here is of 20-ton capacity with specially designed 6-wheel carrier for shovel and crane loads. It has ten speeds forward and two reverse, and a speed range of from 1 to 28 mph. Travel power is supplied through two worm driven axles to four dual-tire rear wheels which are equipped with air brakes. Unit also is convertible to shovel, crane, dragline, clamshell or backdigger.

Six-wheel drive Moto-Crane is a heavy duty, 20 ton capacity crane originally developed for military service. It has double-reduction drive on all axles, eight speeds forward and two reverse, and will travel from 1 to 31 mph. Steering is air power-assisted and air brakes operate on all six wheels.

Self-propelled crane is of single engine, single operator type and power is supplied on four worm-driven rear wheels. It has four travel speeds ranging from 1 to 7 mph in both directions. Hoist, swing, travel and boom derricking may be effected simultaneously. Steering is air powered. Capacity is 20 tons, and unit has air brakes on four rear wheels.

## Infra-Red Heat

(*Concluded from Page* 96)

ticular installation, two exhaust fans of 1200 cfm capacity are used to remove the fumes.

Saving of space was realized not only from the substitution of the two infra-red units, whose total length is 56 ft, but also from the shortening of the conveyor lines formerly employed.

Infra-red heating is used in other drying operations. Nine ovens, employing a total of 7500 lamps, are used in the assembly of the chassis. Many of these ovens are of the ceiling suspension type, Figs. 4 and 6, thus providing a great saving in floor space, an important consideration in economic plant layout. Altogether 200 various size parts have been dried in these ovens, and on occasions as many as 90 different parts have been subjected to one heating cycle without impairing quality of the finish in any respect.

## Announce Process for Nickel Plating Pipe Inside

Inside of steel pipe can be electroplated with nickel or other metals by means of a new process that develops a smooth, ductile, pore-free nickel deposit fully adherent to base metal. It can be applied to pipe or tubing up to 18 in. overall diameter, in random lengths up to about 20 ft. Use of the Lectro-Clad process, developed by Bart Mfg. Co., 227 Main Steet, Belleville 9, N. J., gives steel pipe the corrosion-resistance of nickel, while retaining low cost, strength, and fabricating characteristics of steel.

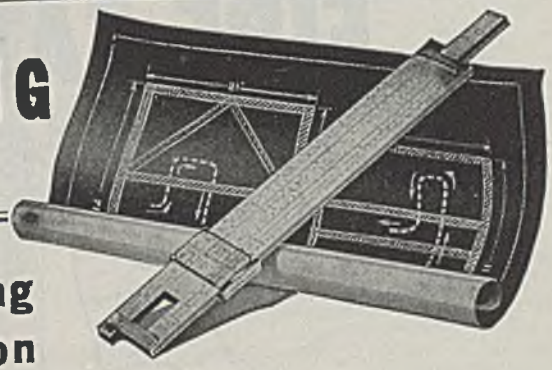
Fittings and pipe line accessories are available for complete piping systems. Welding and fabricating techniques have been fully developed. Internally plated pipe can be welded, reduced and bent, hot or cold, without destroying any portion of the internal lining. In reducing tubing by cold reduction method, it is possible to predetermine actual thickness of plating throughout entire reduction, because applied metal and base metal reduce in equal ratio.

Processed pipe is expected to find wide use in the production or handling of petroleum, chemicals, foods, textiles, plastics, glue, gelatin, paints, varnishes, sugar, paper, pulp, dye stuffs, glass and ceramics.

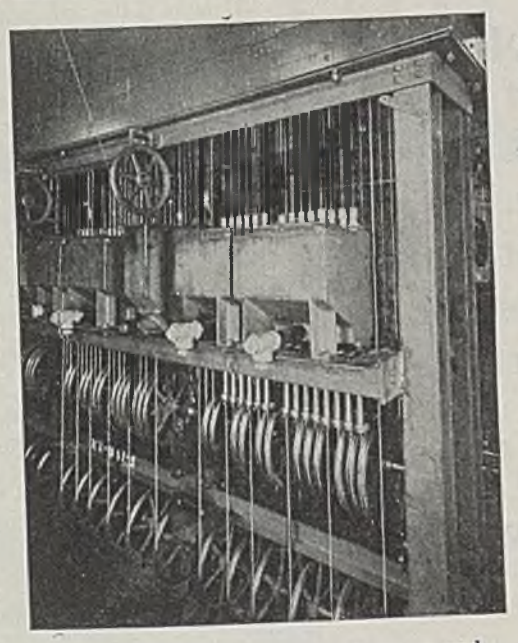
—o—

Self-sealing tapes in a wide variety of types, colors and tensile strengths are being shown throughout the country by two traveling exhibits of International Plastic Corp., Morristown, N. J. Two lines are featured—the Filmonize line for industrial and commercial uses, and the Tapit line for office and home use.

# OVEN ENGINEERING NEWS



## Country's Largest Strand Coating System Features Constant Tension and Variable Speed Handling



*Right: Multi-coat coating system showing arrangement of coating pot and driving sheaves.*

THE coating equipment shown on this page, designed and built by **IOE** engineers, is the biggest installation of its type in the country, having a total capacity of 40,000,000 feet of production per month through 21 consecutive continuous resin coats. In designing and building this equipment the previous processing time of several hours for a complete operation was reduced to minutes, effecting a tremendous saving in time and money.

This equipment not only makes 21 consecutive coats or dips continuously and at very high speeds but is capable of applying many different types of coatings, including lacquers, varnishes, solvent resins, water dispersed resins, and latex, through any number of coats up to and including twenty-one.

The intermittent high speed drying between successive coats is accomplished by direct gas fired convection heater units which are designed to handle highly explosive solvents or plasticizers.

This particular equipment handles eight consecutive ends which operate independently of each other although having a common drying unit. Speeds are independently variable and depend on the material, the type of coating and the diameter of the cord being processed. Each end of the cable or cord is equipped with its own constant tension variable speed takeup unit.

An installation such as this has a wide number of uses, being capable of processing wire, cord, cable, rope and other continuous filament materials of similar cross section within wide limitations of size, material and process.

All types of finishes, either organic or inorganic, water soluble or solvent soluble, can be applied at high speeds and with accurate coating build-up.

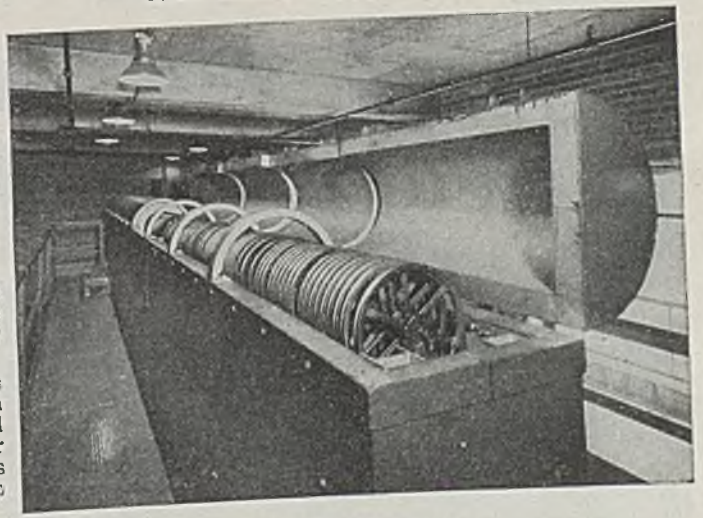
This type of high speed coating equipment is typical of many special duty installations we have made. We have likewise designed and built a number of similar systems that have proven unusually economical to operate because they have always been rigidly engineered with an eye to operating and maintenance economies and to exact processing requirements.

### You'll Find These Useful

For the last four months, our advertisements have been describing different types of recent installations we have made. These and a copy of "Lacquering of Insulated Wire and Cable" an easily comprehended description of the four basic types of continuous wire finishing systems, profusely illustrated, (a reprint of our 16-page article in *Wire and Wire Products*,) are available for your scrutiny and profitable study.

In the coming battle of costs, you cannot afford to be without such basic information. Send for this material today.

*Below: Accessory sheaves make easy threading.*



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## Clamping Jig

(*Concluded from Page* 100)

of the jig keeps chips and cutting oils from contact with any of the internal parts, thereby avoiding damage and excessive wear.

Safety features embodied provide that no movement of working parts is possible without action of the operating lever. The tray is positively clamped at any location in up or down strokes and any sudden weight or pressure applied to the tray instantly throws the second cone lock into action, thus securing the tray at the original position. Another feature is the conversion from right-hand to left-hand operation without using additional parts.

Three styles include the three-post, the up-clamp style and the bridge style. The three-post type may be used for most applications found in general machine shop work. The up-clamp type is especially useful where depth of counterbore or drilled holes must be held to close tolerances. The bridge type is necessary wherever large heavy operations must be performed, such as on manifolds, cylinder heads, etc.

Fig. 2 shows a clamp used to hold the rocket shell body nose aginst a fixture while a cross hole was being drilled in the nose end, hole had to be square and center with the nose end. Fig. 1 shows another application of the Cone-Lok.

## Breathing Apparatus Generates Own Oxygen

Breathing apparatus employing a replaceable chemical canister generates its own oxygen and gives the wearer 1 hr protection in unbreathable air. It weighs only 13½ lb complete, and has no cylinders, high-pressure valves or fittings. Made by Mine Safety Appliances Co., Pittsburgh, Chemox apparatus is suited to requirements of industry and fire departments in meeting emergencies where high concentrations of poisonous gas or oxygen deficiencies are encountered.

Mask generates its own oxygen supply, operating independently of the outside air. Chemical combination in a simple canister creates oxygen by merely breathing into it. Exhaled breath passes from the "All-Vision" facepiece through exhalation tube and into canister where carbon dioxide is removed. Evolved oxygen flows into breathing bag reservoir, then to facepiece through inhalation tube.

Apparatus is simple to use, can be worn, and operated without special training, and is quickly put on. Before canister is exhausted, a pre-set alarm bell rings a warning to replace canister with a fresh one.

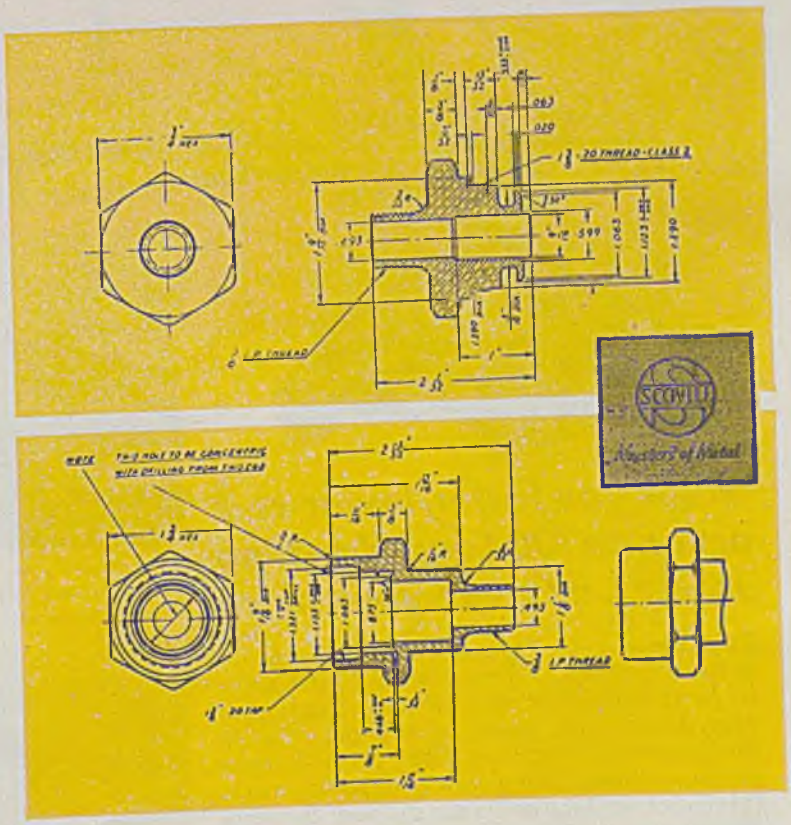
# Scovill
## NON-FERROUS FORGINGS

*When SCOVILL becomes your METAL PARTner*

**You Can Cut Costs on Metal Parts like these**

These drawings show the two parts of a special coupling *forged and machined* by Scovill. Both parts were previously turned out on a screw machine from 1¾" hexagonal brass bar stock . . . the male section requiring 2,050 lbs. of rod per thousand pieces . . . the shank section requiring 2,500 lbs. When Scovill did the job by forging, metal requirements of the male section dropped to 884 lbs . . . the shank to 964. *Total savings of brass were 2,702 lbs. per thousand assemblies.*

Although the forging and machining of these pieces involved no particular engineering skill, this case study shows how Scovill's fast metal-working equipment can turn out parts from less metal at lower costs.



If you suspect that your brass, aluminum and other non-ferrous metal parts are costing you too much or can be made better in another design, you're ready to talk things over with Scovill. Scovill's long forging experience has probably licked tougher problems than yours.

INVESTIGATE SCOVILL. All you have to do to discover whether you'll benefit from making us *your* METAL-PARTner, is to fill in the coupon below and mail it today. Scovill Manufacturing Company, Waterbury 91, Conn.

Please send me information about your metal-working facilities. I am interested in metal forgings for the applications checked:

- ☐ Aircraft
- ☐ Automobiles
- ☐ Band Instruments
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- ☐ Fire Extinguishers
- ☐ Household Appliances
- ☐ Industrial Instruments
- ☐ Plumbing Goods
- ☐ Pumps
- ☐ Valves
- ☐ Welding Equipment

Other applications .....

.....

**SCOVILL MANUFACTURING COMPANY**
Forgings Division
20 Mill Street
Waterbury 91, Connecticut

Name .....

Company .....

Address .....

## Rebuilt Turbine Housing

(*Concluded from Page* 108)

sure an absolutely uniform thickness of coating on all treated surfaces. An angle iron was bolted across the casing and a length of pipe welded at right angles to the bottom of the angle iron. A short length shaft was inserted in this pipe and the end of the shaft drilled for a rod which was locked in position by a set screw. The metallizing gun was mounted at one end by means of the tool-post mounting and a counterweight welded to the other end of this rod.

Areas treated with steel grit are easily distinguished by the light gray appearance of the stainless steel. After the machine has been in service for some time, the action of the steam and water thrown off by the rotor will automatically polish away the matte surface of the stainless steel and present a bright, tough, non-corrosive surface which will resist attack for many years. Appearance of the built up rib is shown in Fig. 5.

Estimated cost of the job was $214. Thus, by metallizing, a piece of equipment costing over $60,000 and not replaceable under conditions then prevalent was restored to service.

## Handbook of Specifications Covers Cincinnati Grinders

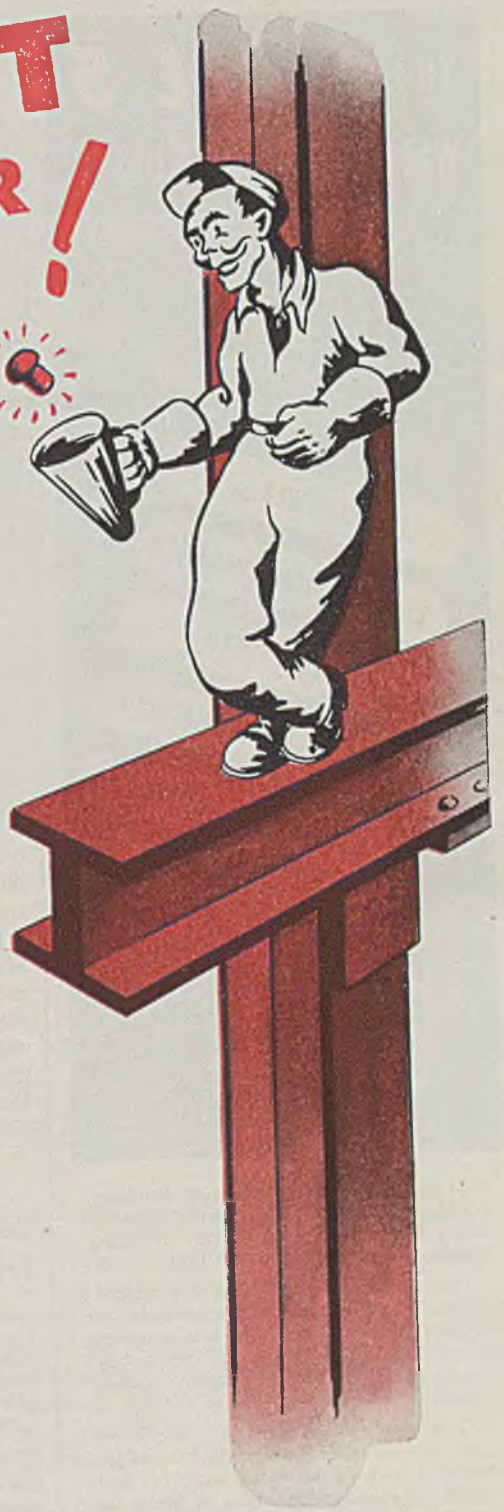
Following a plan already carried out in connection with milling machines, Cincinnati Milling and Grinding Machines, Inc., Oakley, Cincinnati 9, O., now has completed a handbook giving technical specifications on its center type and centerless grinding machines, and its centerless lapping machines.

As can be inferred from its title, "Engineering Data on Cincinnati Grinding Machines," the primary purpose of this book is to give concrete help to tool engineers, methods engineers, time study men and other technical specialists who must have exact and complete information on dimensions of machines, work holding capacity, work holding facilities, wheel requirements, speeds and feeds, etc.

All this is taken care of in the book by devoting each of its left hand, 8½ x 11 in., pages to tables, while its right hand pages are devoted to clearly reproduced drawings giving all dimensions necessary to the allocation and setting up of work, planning of fixtures, etc. Each machine also is illustrated by a photograph.

Copies of this book are available free of charge to those who properly identify themselves by writing for it on official letterheads of their respective companies, setting forth in the letter the nature of their duties.

# YEARS AT IT IS THE ANSWER!



Designing an industrial heat treat furnace—like the free-and-easy performance of a structural steel worker—might appear to be a simple matter; but to attain the required degree of skill takes years of practical experience.

The Holcroft organization of furnace specialists offers exactly that experience. During the past 30 years we've supplied thousands of furnaces to the mass-production industries, each designed individually for the specific job.

In Holcroft is a consulting engineering service impartial to any one fuel or type of mechanism. Thus, without bids, we select the design features which are *best suited to the particular application* — frequently devising new and better methods in the process. The result is a furnace which meets the closest requirements for volume and quality of production, with maximum operating economy.

Before you invest in furnace equipment for production work of *any* type, we invite you to discuss your problem with our staff of long-time specialists—without obligation on your part.

ELECTRIC AND COMBUSTION

*Furnaces*

BUILT BY HOLCROFT & COMPANY DETROIT-MICH.

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## Plastic Coating

(*Concluded from Page* 114)

Equipment is shown in photograph on p. 114. Coating selected for the protection of this Amertorp plating equipment was Amercoat No. 33 plastic coating manufactured by Amercoat Division of American Pipe and Construction Co., Los Angeles, Calif. The coating is a combination of resistant vinyl resins, pigments, and plasticizers and combines many of the properties of molded plastic products. As paint solvents evaporate, an inert plastic film is formed which provides excellent chemical resistance. It is applied cold, and requires no force drying or baking.

### Sandblast Prepares Surface

Most effective method of surface preparation for this coating was found to be sandblasting of all metal surfaces to remove rust, mill scale, previous coatings, and corrosion products. Coating was then applied by brush in 5 separate coats to form a film of appreciable thickness. Quick drying made it possible to apply coats at 2-hr intervals and allowed the plating tanks and equipment to be placed in service the following day. Surfaces of the wooden tank were clean, dry and well sanded before any application was made.

In order to maintain the plating room in a clean and orderly condition, the coated surfaces are periodically scrubbed with plain water. This plastic coating is unaffected by the water, and does not stain by contact with plating chemicals. Even many washings with hot alkaline cleaners does not change the appearance of the coating.

## Reclaiming Raw Materials From Vast Stores in Sea

*Raw Materials from the Sea,* by E. Frankland Armstrong and L. McKenzie Miall; 164 pages, 5½ x 8¼ inches; published by Constructive Publications Ltd., 213 London Road, Leicester, England.

The story of the sea from a chemical aspect is the theme of this volume, showing how for millions of years it has been receiving vast quantities of substances washed down by rivers. In addition to salt, which has been recovered as essential to life for many generations, magnesium, lightest metal used in engineering construction is an important product. The sea also contains in addition to metallic salts many chemical substances used in industry, science and medicine

The book is written for the general reader interested in scientific matters, as well as for chemical engineers and students in colleges and universities. Methods of reclaiming these substances from sea water are discussed at length in this volume.

## Handling Spike Kegs

(*Concluded from Page* 117)

for the forks of a truck (See Fig. 1) to be inserted for raising load. Enough of the pallets were constructed so that operators in this department always have a supply of them on hand.

After starting the electric fork truck system, it was discovered that a constant supply of empty kegs was needed at the point where they were to be filled. This problem was solved by designing a special keg cage (Figs. 2 and 3) having a capacity of 48 kegs. The cages can be built of heavy wire mesh or expanded metal, preferably the former, with angle-iron corner posts reinforced with gussets where posts are welded to steel-plate floor, and the whole supported by two small beams again spaced widely enough to permit insertion of forks for lifting. A side-hinged door makes for easy access to load. Top is open to permit high stacking.

This cage is loaded with empties in the empty keg warehouse, as shown in Fig. 3, and is picked up by the fork truck on its return from delivering a load of full kegs (Fig. 2), thereby completing an economical circuit with no lost time.

The complete cycle, which speeds production and spares valuable men is as follows: Driver of fork truck places an empty skid-pallet near the production machine. Kegs are filled and placed on skid, 12 full kegs of 200 lb each per skid. Nailers then seal the kegs and the pallet, fully loaded, is ready to be moved. Loaded skid, totalling 2800 gross pounds, is lifted and quickly and safely transported to storage or to a freight car.

When these loads are put into storage, the trucks stack them five tiers high. This ceiling-high stacking saves many feet of floor space, plus miles of travel for the fork truck, in this case a product of Clark Tructractor Co., Battle Creek, Mich.

Average volume of work in trips per day for one electric fork truck is 154 trips per 8 hr day, carrying 1848 full kegs or 369,000 lb of useful load.

## Bendix Offers New Brake

A new Bendix coaster brake is announced by Eclipse Machine Division, Bendix Aviation Corp., Elmira, N. Y., also manufacturers of the Morrow coaster brake. Engineered for efficient braking of bicycles, the light-weight Bendix is said to require a minimum of pedal pressure and travel. Its brake shoes are self-aligning and each brake is sealed against dirt and water and thoroughly factory-tested. It is finished in chrome, with cadmium-plated sprocket.

PHOTO COURTESY OF THE BETTMAN ARCHIVE

FROM A METAL-MASTER'S "FAMILY ALBUM"

# WHEN LOCOMOTIVE WHEELS WERE MADE LIKE THIS...

## STANDARD STEEL'S present home had been a source of metals for . . . 70 years

You'll notice—in this scene in the shop of some important locomotive wheel supplier of the early 1860's—that although the product was metal most of the equipment was wood and that muscle played as large a part as machinery in the operations. When all this represented standard production practice, Standard Steel's ancestor "Freedom Forge," already over 70 years old, was one of the largest in the state with eight fires and five hammers, and had a tire mill with capacity of 2000 per year.

Pioneers in the early days of the country, Standard Steel has been pioneering ever since. One important development is in rolled wheels, where Standard was the first to retain the axis of the ingot as the axis of the wheel. Recent developments include improvements in heat treatment and control of rate of cooling, which have greatly increased the safety and serviceability of the product.

When you need forgings or castings, 151 years of accumulated experience is waiting to serve you here . . . backed by complete modern facilities. To simplify purchasing problems, "Standardize on Standard."

BLW THE BALDWIN GROUP

**BALDWIN**

**FORGINGS AND CASTINGS**

The Baldwin Locomotive Works, Standard Steel Works Division, Burnham, Pa., U.S.A. Offices: Philadelphia, New York, Chicago, St. Louis, Washington, Boston, San Francisco, Cleveland, Detroit, Pittsburgh, Houston, Birmingham.

"STANDARDIZE ON STANDARD" FOR YOUR FORGINGS AND CASTINGS

# the BUSINESS TREND

CONTINUED recovery of steelmaking from the recent steel industry strike pushed STEEL's industrial production index up to 103 per cent (preliminary) for the week ended March 2, a 23-point rise over the previous week.

Although the current level of the index has risen appreciably above the steel strike period low of 74 per cent in the week ended Feb. 16, it is still considerably below the 124 per cent of the week ended Nov. 17, high point since V-J Day.

**AUTOS**—Still feeling effects of the steel strike, as well as other work stoppages, the automobile industry in the week ended March 2 produced only 17,575 cars, compared with 19,410 in the previous week. However, production plans of two of the biggest producers indicate near-term improvement in auto output.

**COAL**—Although a coal miners' strike threatens to impede industry, current bituminous coal production continues high. In the week ended Feb. 23, estimated output was 12,600,000 tons. Production to that date this year was 93,445,000 tons, or 2.2 per cent ahead of the corresponding period of last year.

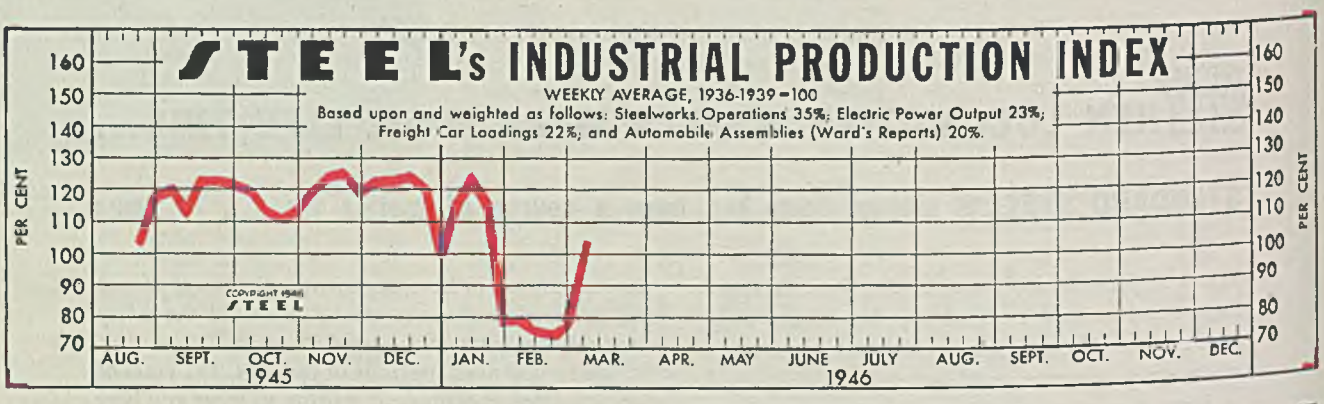
**STOCKS**—Prevalent in Wall Street is the opinion that the sharp correction recently in the stock market has not yet been completed. Although the decline that began in mid-February erased a substantial portion of the advance which started last summer, the outlook remains somewhat pessimistic because of continued labor troubles and a darkened outlook for earnings.

**FRB INDEX**—Work stoppages depressed the Federal Reserve Board's industrial production index in January to 159 per cent (preliminary) of the 1935-1939 average, compared with 164 in December. The January level of the index was the lowest since June, 1941.

**STRUCTURAL STEEL**—Increased demand and orders accumulated during the recent steel strike contributed to an increase in backlog of fabricators of structural steel for bridge and building construction. Estimated tons available at the end of January for fabrication within the next four months were 552,135. Total bookings in January were estimated at 211,182 tons, compared with a 107,578-ton average for January, 1936-1940. January shipments were 86,371 tons, against the January, 1936-1940, average of 92,578 tons.

**CONSTRUCTION**—Total construction in January in 37 states east of the Rocky mountains was $357,501,000, an increase over the December total of $330,685,000, F. W. Dodge Corp. reports.

**PRICES**—The Bureau of Labor Statistics index of commodity prices in primary markets rose 0.2 per cent in the week ended Feb. 23 from increases in industrial and agricultural commodities. At 107.4 per cent of the 1926 average, the index was 0.6 per cent above late January.




The Index (see chart above): Latest Week (preliminary) 103 Previous Week 80 Month Ago 77

## FIGURES THIS WEEK

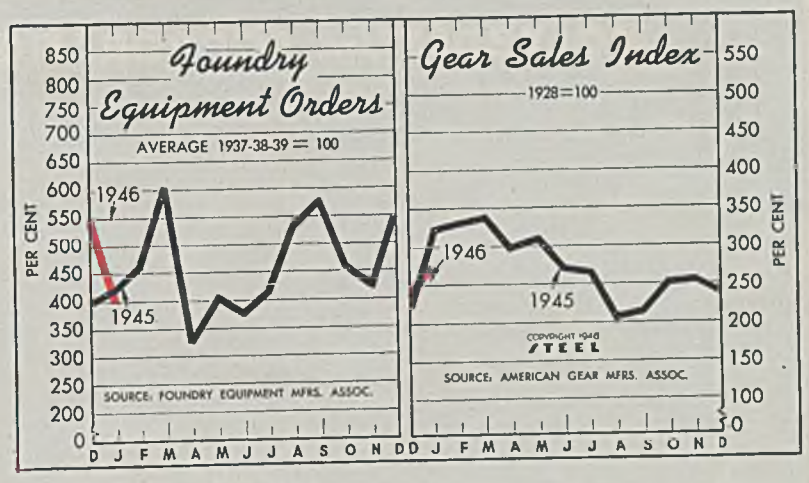
| INDUSTRY | Latest Period* | Prior Week | Month Ago | Year Ago |
|---|---|---|---|---|
| Steel Ingot Output (per cent of capacity) | 56 | 16 | 5.5 | 96 |
| Electric Power Distributed (million kilowatt hours) | 4,000 | 3,923 | 3,983 | 4,472 |
| Bituminous Coal Production (daily av.—1000 tons) | 2,100 | 2,030 | 2,087 | 1,987 |
| Petroleum Production (daily av.—1000 bbls.) | 4,726 | 4,714 | 4,609 | 4,765 |
| Construction Volume (ENR—Unit $1,000,000) | $96.9 | $51.6 | $70.2 | $39.0 |
| Automobile and Truck Output (Ward's—number units) | 17,575 | 19,410 | 29,295 | 18,545 |

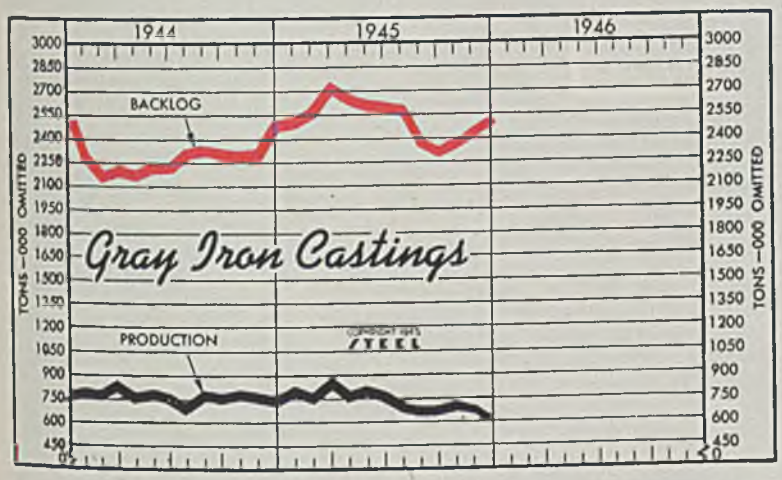
*Dates on request.

| TRADE | | | | |
|---|---|---|---|---|
| Freight Carloadings (unit—1000 cars) | 735† | 723 | 723 | 785 |
| Business Failures (Dun & Bradstreet, number) | 15 | 18 | 81 | 18 |
| Money in Circulation (in millions of dollars)‡ | $27,938 | $27,955 | $27,914 | $25,750 |
| Department Store Sales (change from like wk. a yr. ago)‡ | +20% | +19% | +17% | +21% |

†Preliminary. ‡Federal Reserve Board.

| | Foundry Equipment Orders Index (1937-38-39=100) | | | Gear Sales Index (1928=100) | | |
|---|---|---|---|---|---|---|
| | 1946 | 1945 | 1944 | 1946 | 1945 | 1944 |
| Jan. | 392.8 | 422.4 | 378.3 | 269 | 323 | 246 |
| Feb. | .... | 465.3 | 456.8 | ... | 331 | 214 |
| Mar. | .... | 604.7 | 498.4 | ... | 339 | 485 |
| Apr. | .... | 325.0 | 385.7 | ... | 296 | 308 |
| May | .... | 404.7 | 503.9 | ... | 309 | 305 |
| June | .... | 375.4 | 466.1 | ... | 271 | 328 |
| July | .... | 411.7 | 375.8 | ... | 264 | 242 |
| Aug. | .... | 532.2 | 450.5 | ... | 205 | 247 |
| Sept. | ... | 577.2 | 388.0 | ... | 213 | 248 |
| Oct. | .... | 457.8 | 526.5 | ... | 251 | 293 |
| Nov. | .... | 416.6 | 389.5 | ... | 255 | 209 |
| Dec. | .... | 547.6 | 397.4 | ... | 239 | 219 |
| Ave. | .... | 461.7 | 433.1 | ... | 275 | 279 |



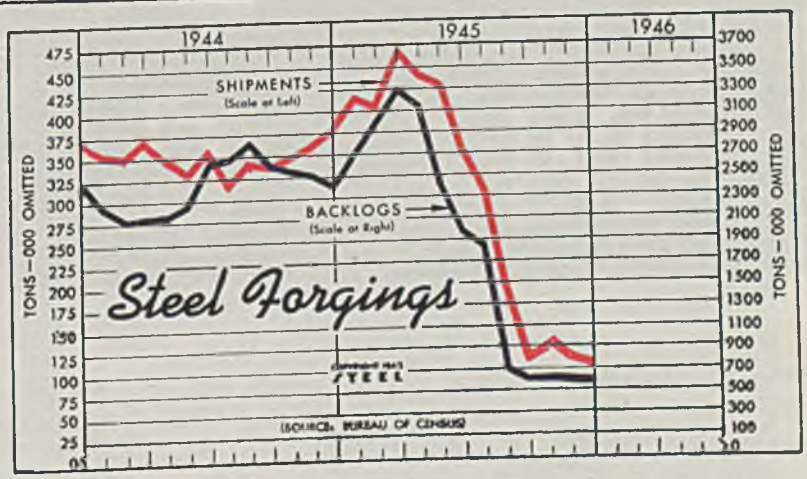




**Gray Iron Castings**
(U. S. Bureau of Census)
Tons—000 omitted

| | Production 1945 | Production 1944 | Backlog 1945 | Backlog 1944 |
|---|---|---|---|---|
| Jan. | 791 | 765 | 2,497 | 2,259 |
| Feb. | 752 | 764 | 2,562 | 2,145 |
| March | 858 | 829 | 2,714 | 2,184 |
| April | 774 | 758 | 2,641 | 2,159 |
| May | 798 | 791 | 2,603 | 2,205 |
| June | 782 | 763 | 2,596 | 2,213 |
| July | 690 | 690 | 2,565 | 2,314 |
| Aug. | 683 | 778 | 2,375 | 2,335 |
| Sept. | 662 | 745 | 2,325 | 2,304 |
| Oct. | 684 | 780 | 2,403 | 2,297 |
| Nov. | 688 | 760 | 2,454 | 2,300 |
| Dec. | 612 | 742 | 2,527 | 2,475 |
| Mo. Ave. | 729 | 764 | 2,522 | 2,266 |

**Steel Forgings**
Tons—000 omitted

| | Shipments 1945 | Shipments 1944 | Backlog 1945 | Backlog 1944 | Consumption of steel 1945 | Consumption of steel 1944 |
|---|---|---|---|---|---|---|
| Jan. | 417 | 355 | 2,723 | 2,256 | 556 | 521 |
| Feb. | 406 | 350 | 3,018 | 2,132 | 544 | 509 |
| Mar. | 469 | 370 | 3,304 | 2,142 | 632 | 521 |
| Apr. | 442 | 347 | 3,147 | 2,166 | 576 | 494 |
| May | 430 | 330 | 2,428 | 2,252 | 567 | 453 |
| June | 357 | 359 | 1,947 | 2,637 | 467 | 487 |
| July | 306 | 315 | 1,855 | 2,670 | 393 | 441 |
| Aug. | 195 | 341 | 696 | 2,821 | 257 | 483 |
| Sept. | 110 | 336 | 623 | 2,602 | 152 | 463 |
| Oct. | 128 | 348 | 643 | 2,564 | 173 | 488 |
| Nov. | 118 | 360 | 620 | 2,510 | 163 | 488 |
| Dec. | 104 | 377 | 603 | 2,408 | 136 | 506 |




## FINANCE

| | Latest Period* | Prior Week | Month Ago | Year Ago |
|---|---|---|---|---|
| Bank Clearings (Dun & Bradstreet—millions) | $9,838 | $13,266 | $11,862 | $9,412 |
| Federal Gross Debt (billions) | $279.7 | $279.5 | $279.2 | $234.9 |
| Bond Volume, NYSE (millions) | $32.2 | $31.7 | $34.6 | $53.3 |
| Stocks Sales, NYSE (thousands) | 8,948 | 7,598 | 12,921 | 8,966 |
| Loans and Investments (billions)† | $68.2 | $67.9 | $68.1 | $58.8 |
| United States Gov't. Obligations Held (millions)† | $49,586 | $49,485 | $49,531 | $44,105 |

†Member banks, Federal Reserve System.

## PRICES

| | | | | |
|---|---|---|---|---|
| STEEL's composite finished steel price average | $58.27 | $58.27 | $58.27 | $57.55 |
| All Commodities† | 107.4 | 107.2 | 106.8 | 104.8 |
| Industrial Raw Materials† | 119.7 | 119.7 | 119.0 | 115.7 |
| Manufactured Products† | 103.4 | 103.2 | 102.9 | 101.6 |

†Bureau of Labor Statistics Index, 1926=100.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MARCH, 1946

Advertisement

# COPPER ALLOY BULLETIN

REPORTING NEWS AND TECHNICAL DEVELOPMENTS OF COPPER AND COPPER-BASE ALLOYS

*Prepared Each Month by Bridgeport Brass Co.* "Bridgeport" BRASS CO. *Headquarters for BRASS, BRONZE and COPPER*

## Beauty of Copper and Copper Alloys Enhanced by Coloring Treatments

Brass and copper have long been valued for natural beauty and wide range of colors such as bright yellow, light golden, rich bronze, copper and many others, depending upon the alloy composition. For example, there are certain copper base alloys which so closely resemble gold in color that many manufacturers of jewelry and similar products merely form, clean and use them without the necessity of any coloring treatments.

However, there are applications which require shades of brown, black, red, blue, and green as well as artificial patinas and antique finishes.

Costume jewelry is an important outlet for lasting and beautiful finishes. Another application is building hardware designed to match a decorative scheme or blend with the building material. In that same category is metallic trim used both inside and outside buildings for decorative purposes. There are also a host of objects such as lamps, vases and ash trays where beauty is added to utility through special colors. Other common applications are vanity cases, cigarette cases, lighters and other personal accessories. These are only a few of the many uses for copper and brass with special finishes and colors.

### Accurate Control Essential

The coloring of metal by chemical methods should not be undertaken without thorough knowledge of the subject and sufficient experience because of the many variable factors. Temperature of the solution is extremely important and a slight change one way or the other may make it impossible to achieve the desired effect. Concentration of the solution is equally important, and immersion time may range from seconds to minutes, depending upon the other factors. Many of the color finishes described in this article should be protected by a good lacquer coating.

### Chemical Coloring of Brass

In all chemical coloring of metals it is absolutely essential that the pieces be thoroughly cleaned. This can be accomplished through alkaline cleaning followed by bright dipping prior to coloring. It is often necessary to immerse the pieces more than once in the coloring solution to obtain the desired shade.

*Blue Black.* One of the common colors obtained by immersion of brass in a chemical solution is blue-black. The formula most commonly used is:

Copper carbonate 1 pound
Ammonum hydroxide 1 quart
Water 3 quarts

During the very brief interval while the brass is in this solution, shades of brown, green and greenish-blue will appear before the final black. However, it would not be wise to try to take advantage of these intermediate changes because they occur so fast.

Blacks can also be obtained from chemicals other than those indicated, with shades ranging from bluish or grayish to jet black.

*Shades of Brown.* Various browns may be obtained by a solution of the following approximate compositions:

Copper sulphate 3-5 ounces
Potassium chlorate 6-8 ounces
Water 1 gallon

Work is immersed in this solution and then without rinsing, transferred to a potassium sulfide solution of ½ to 1 ounce per gallon of water. Thorough rinsing in water is essential and it may be necessary to repeat the operations in order to obtain a darker color. After coloring, work should be rinsed in hot water and dried. Scratch brush to obtain pleasing appearance.

*Red.* A red color can be obtained by immersing the brass in a solution of the following approximate composition:

Iron nitrate 5 ounces
Sodium hyposulphite 5 ounces
Water 1 gallon

When this solution is heated to a temperature of approximately 175° F, the reaction will take place more rapidly.

*Blue.* This color is obtained by immersing in a solution of approximately the following composition:

Sodium hyposulphite 8 ounces
Lead acetate 4 ounces
Water 1 gallon

Immerse long enough to produce color. Use at boiling temperature.

*Patina.* According to some authorities, a patina effect on brass may be obtained by immersing it in a solution of copper nitrate, ammonum chloride, calcium chloride and water at room temperature. In service, patina effects result from long exposure to the weather.

### Chemical Coloring of Copper

The necessity for a thoroughly clean surface applies to copper as well as to brass.

*Light Brown to Black.* A range of colors from light brown through dark brown, to black may be obtained by immersing copper in certain sulphide solutions such as potassium sulphide, sodium sulphide or others. Low concentrations from ½ to 1½ ounces of these materials to 1 gallon of water are usually sufficient. The time

(*Continued on page 2, col. 2*)

Articles such as these lend themselves to coloring

## CAUSES OF CORROSION

*This article is one of a series of discussions by C. L. Bulow, research chemist of the Bridgeport Brass Company.*

### EFFECT OF STRESS ON CORROSION
### How Residual Stresses Are Set Up

The bending of any metal beyond its elastic limit produces some permanent set, i. e., the metal does not spring back to its original position when the load is removed. The plastically deformed metal is then in a state of internal stress (residual stress).

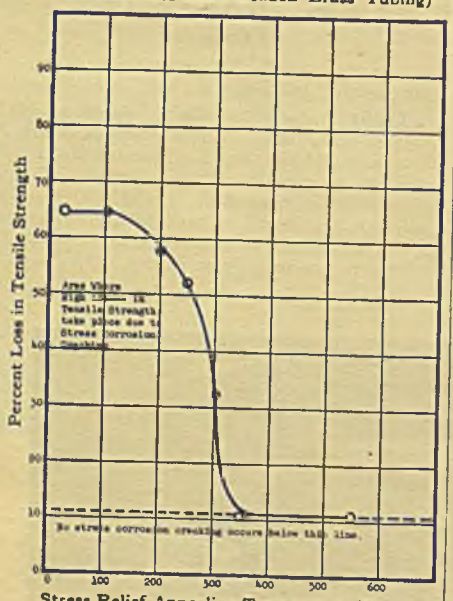
#### Effect and Removal of Residual Stresses

Drawn bars and rods have considerable residual stresses which can be detected by careful measurements after cutting the bar lengthwise which allows the two halves to bend outwards.

These residual stresses are the cause of unwanted warping during machining and stress corrosion cracking in cold worked alloys.

Fig. 1, Effect of Stress Relief Annealing Temperature on Stress Corrosion Cracking.

(Alternate Immersion in 15 normal $NH_4OH$ Solution 50% Hard Leaded Brass Tubing)




Stress Relief Annealing Temperature °C.
(1 hour anneals)

Residual stresses, produced by cold working, can be reduced or removed by stress relief annealing without softening or lowering the tensile strength. The temperature required for reduction or removal of such stresses varies with the composition of the alloy.

#### Tests for Stress Corrosion Cracking

Samples of 50% hard leaded brass tubing were stress relief annealed at various temperatures and then were alternately immersed in 15 N Ammonium Hydroxide solution for 16 hours. Tensile tests were made before and after immersion. The results are given in Fig. 1. The percent loss which occurred in the tensile strength of the tubing was plotted against the temperature used to stress relief anneal the material. It is evident from this work that the most marked relief of stresses occurs over a narrow temperature range and apparently is not complete until recrystallization takes place. This has been known in the metal industry for decades. The relief annealing of stressed metal parts is standard practice in the metal industry.

## Beauty of Copper and Copper Alloys Enhanced by Coloring Treatments

(*Continued from page 1*)

of immersion and concentration of solution determine the depth of color obtained. After coloring, thorough rinsing and drying is essential. Light brushing afterwards produces many pleasing effects.

*Patina.* Patina colors will develop on copper after long exposure to the elements. This effect can be artificially produced by wetting the copper with suitable chemicals and allowing to stand for short periods.

#### Colors by Electrochemical Methods

Shades ranging from delicate pastels to deep tones of blue, red, yellow and green can be produced by electrochemical procedure. The colors are produced with one plating solution simply by varying the length of time that the work remains in the bath. Underlying surface effects, such as those produced by polishing or scratching before plating, are reproduced in the final finish. Multi-color effects and designs in several shades can be obtained by using stop-offs. Many of the electrolytic processes are patented and full information may be obtained through trade literature.

The cleaning of copper base alloys by soaps and acids is briefly discussed in Bridgeport's Technical Handbook. Requests for this 128 page handbook should be made on company stationery.

## NEW DEVELOPMENTS

*This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.*

**A New Enamel Stripper** has been developed for removal of many types of organic coatings. Synthetic enamels such as alkyds, melamine, urea formaldehyde and other coatings are said to be removed cleanly by a wrinkling action leaving the work clean and bright, with no attack on the base metal. **No. 665**

**A Micrometer** incorporating the advantages of a dial indicator, can be used as a dial indicator comparator, it is claimed. As a micrometer, the spindle can be brought in contact with the work until the indicator hand reads "0" and the measurement is then read on the barrel and thimble. As an indicating comparator, it can be set to the nearest thousandth of an inch, and the variation from that setting can be read on the dial. **No. 666**

**A Screwless Vise** makes use of a movable jaw which can be adjusted to the work and then locked by a press on the locking lever. Jaws have built-in recessed parallels, and a removable V-jaw accessory is claimed to facilitate the drilling of round stock. **No. 667**

**A New Metal-Locating Unit** will locate and tell the depth of cable and pipe. Operation in the field is said to be simple and the results accurate. The locator can be used for determining the location of shorts, crosses, grounds and wet spots in cable construction. **No. 668**

**A New Soldering "Gun"** is claimed to heat in just a few seconds, and to cool as quickly, minimizing the danger of burns to the operator or to objects with which it may come into contact. Tip design permits its use in hard-to-reach places. Current is used only when trigger-like switch is held in. **No. 669**

**An Air Regulating,** filtering and lubricating unit is claimed to perform three functions in equipment operated by compressed air: first, it regulates the air pressure; second, it filters the air to remove rust, scale or water; and third, it lubricates the working parts of the air equipment by injecting a continuous oil mist into the air supply line. **No. 670**

**A New Hand-Bending Tool** is claimed to permit all kinds of small tubing to be bent to any desired angle. Radius and holding blocks and the roll are so grooved as to prevent crushing or change in sections of the tubing. **No. 671**

**A New Type of Jack** is claimed to open pipe flanges for gasket renewal against a load as high as 15 tons. It is said to operate with a minimum of effort and exerts pressure smoothly and evenly, without shock to nearby joints, maintaining bolt holes in continuous alignment. **No. 672**

# Steel Production Rate up Almost to Prestrike Level

*Coal and railroad strike threats disturb industry . . . Higher prices by OPA help situation . . . Scrap, pig iron short*

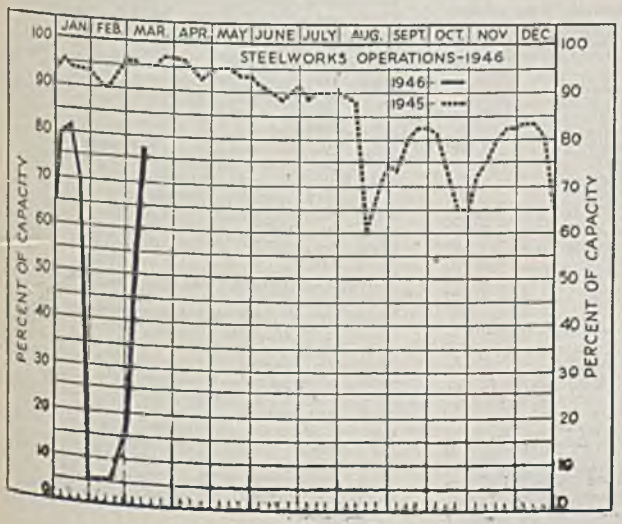
STEELMAKERS are seeking to meet the insistent call for their products and production has climbed almost to the level prevailing before the strike of steelworkers.

Steel production rose 21½ points last week, to an estimated national rate of 77½ per cent of capacity, compared with 86 per cent the week of Jan. 12, before the steel strike and 70 per cent the week of Jan. 19, when effects of the approaching stoppage were being felt.

With inquiry increasingly active and pressure for deliveries most insistent the industry is threatened by a possible soft coal strike next month, as well as a strike of railroad workers. The latter would be more quickly paralyzing than the former. However the trade expects a peaceful settlement of the rail dispute, but is less sanguine as to the coal situation. Thus the industry is faced with a possible second major setback before it has fully recovered from the steel strike.

Individual steel companies are estimated to have from two to six weeks supply of coal in stock. While the mines operated during the steel strike the position of steel producers was not greatly improved as they were unable to unload shipments. As a result, a coal strike of any duration would soon bring steel production to a standstill. Demand for coke for industrial purposes is decidedly heavy, in spite of the fact that slow recovery in pig iron production at some points is making more coke available than otherwise would be the case. Some sellers say there appears to be no limit to this demand, because of desire of consumers to build inventories to tide over in event of a coal strike.

Inquiry for steel is increasingly active and various buyers are pressing to get as much tonnage as possible on books, regardless of actual needs. While producers for some time have taken serious and in many cases effective measures in discouraging this type of demand it is believed in well informed quarters that once the situation begins to ease, or at least becomes more clarified, much duplicated tonnage will be found on mill books.




**DISTRICT STEEL RATES**

(Percentage of Ingot Capacity Engaged in Leading Districts)

| | Week Ended March 9 | Change | Same Week 1945 | Same Week 1944 |
|---|---|---|---|---|
| Pittsburgh | 88 | +16.5 | 90.5 | 93.5 |
| Chicago | 74 | +13 | 100.5 | 101.5 |
| Eastern Pa. | 73 | +37 | 91 | 94 |
| Youngstown | 75 | +15 | 92 | 95 |
| Wheeling | 90.5 | + 4.5 | 68.5 | 100 |
| Cleveland | 88.5 | +11.5 | 93.5 | 93 |
| Buffalo | 63 | +19 | 90.5 | 90.5 |
| Birmingham | 86 | +29 | 95 | 95 |
| New England | 87 | +12 | 92 | 92 |
| Cincinnati | 81 | +11 | 72 | 92 |
| St. Louis | 82 | +28 | 80 | 74 |
| Detroit | 88 | +24 | 86 | 87 |
| Estimated national rate | 77.5 | +21.5 | 95 | 98.5 |

*Based on steelmaking capacities as of these dates.

Producers have put into effect the increased prices for most steel products announced by Office of Price Administration, retroactive to Feb. 15. New schedules provide increases ranging from $2 to $12 per ton, with an effort to remove some of the inequalities that have hampered production of certain products.

Although the situation is easing in many respects one great deterrent to steel production is shortage of pig iron and scrap. Supply of the former is improving as more blast furnaces get back to normal production but demand from steelmakers and foundries is heavy and they seek much more tonnage than is available. Foundries, especially, have heavy backlogs, with customers pressing for delivery and for placing of more orders. In scrap pressure is still heavy and supply is light. In one eastern market a slight sign of easing is seen in some increase in rejections but this is not sufficient to indicate a softening in demand. Dealers bidding on government scrap in several instances last week bid over ceilings for material to apply on the contracts.

Every district reported gains in steel output last week, rates being as follows: Pittsburgh, 88 per cent, up 16½ points; eastern Pennsylvania 73, up 37 points; Chicago 74, up 13 points; Youngstown 75, up 15 points; Cleveland 88½, up 11½ points; Detroit 88, up 24 points; Wheeling 90½, up 4½ points; Buffalo 63, up 19 points; Cincinnati 81, up 11 points; St. Louis 82, up 28 points; New England 87, up 12 points; Birmingham 86, up 29 points.

Average composite prices of steel and iron products show an increase in finished and semifinished steel, reflecting the new prices announced by Office of Price Administration, effective Feb. 15. Finished steel composite rose $6.18 to $64.45 and semifinished steel rose $2.80 to $40.60. Steelmaking pig iron composite remains at $24.80 and steelmaking scrap at $19.17.

# COMPARISON OF PRICES

| | Mar. 9 | Mar. 2 | Feb. 23 | One Month Ago Feb. 1946 | Three Months Ago Dec. 1945 | One Year Ago Mar. 1945 | Five Years Ago Mar. 1941 |
|---|---|---|---|---|---|---|---|
| Finished Steel | $64.45 | $64.45 | $64.45 | $61.36 | $58.27 | $57.55 | $56.73 |
| Semifinished Steel | 40.60 | 40.60 | 40.60 | 39.20 | 37.80 | 36.00 | 36.00 |
| Steelmaking Pig Iron | 24.80 | 24.80 | 24.80 | 24.80 | 24.25 | 24.05 | 23.05 |
| Steelmaking Scrap | 19.17 | 19.17 | 19.17 | 19.17 | 19.17 | 19.17 | 20.15 |

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

# COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for last Month, Three Months and One Year Ago

Finished Material, cents per lb.; coke, dollars per net ton; others dollars per gross ton.

## Finished Material

| | Mar. 9, 1946 | Feb., 1946 | Dec., 1945 | Mar., 1945 |
|---|---|---|---|---|
| Steel bars, Pittsburgh | 2.50c | 2.375c | 2.25c | 2.15c |
| Steel bars, Philadelphia | 2.82 | 2.695 | 2.57 | 2.47 |
| Steel bars, Chicago | 2.50 | 2.375 | 2.25 | 2.15 |
| Shapes, Pittsburgh | 2.35 | 2.275 | 2.10 | 2.10 |
| Shapes, Philadelphia | 2.465 | 2.340 | 2.215 | 2.215 |
| Shapes, Chicago | 2.35 | 2.225 | 2.10 | 2.10 |
| Plates, Pittsburgh | 2.50 | 2.375 | 2.25 | 2.20 |
| Plates, Philadelphia | 2.55 | 2.425 | 2.30 | 2.25 |
| Plates, Chicago | 2.50 | 2.375 | 2.25 | 2.20 |
| Sheets, hot-rolled, Pittsburgh | 2.425 | 2.3125 | 2.20 | 2.20 |
| Sheets, cold-rolled, Pittsburgh | 3.275 | 3.165 | 3.05 | 3.05 |
| Sheets, No. 24 galv., Pittsburgh | 4.05 | 3.875 | 3.70 | 3.65 |
| Sheets, hot-rolled, Gary | 2.425 | 2.3125 | 2.20 | 2.20 |
| Sheets, cold-rolled, Gary | 3.275 | 3.165 | 3.05 | 3.05 |
| Sheets, No. 24 galv., Gary | 4.05 | 3.875 | 3.70 | 3.65 |
| Hot-rolled strip, over 6 to 12-in., Pitts. | 2.35 | 2.225 | 2.10 | 2.10 |
| Cold-rolled strip, Pittsburgh | 3.05 | 2.925 | 2.80 | 2.80 |
| Bright bess., basic wire, Pittsburgh | 3.05 | 2.90 | 2.75 | 2.60 |
| Wire nails, Pittsburgh | 3.25 | 3.075 | 2.90 | 2.80 |
| Tin plate, per base box, Pittsburgh | $5.25 | $5.125 | $5.00 | $5.00 |

## Semifinished Material

| | | | | |
|---|---|---|---|---|
| Sheet bars, Pittsburgh, Chicago | $38.00 | $37.00 | $36.00 | $34.00 |
| Slabs, Pittsburgh, Chicago | 39.00 | 37.50 | 36.00 | 34.00 |
| Rerolling billets, Pittsburgh | 39.00 | 37.50 | 36.00 | 34.00 |
| Wire rods, No. 5 to 5/32-inch, Pitts. | 2.30c | 2.225c | 2.15c | 2.00c |

## Pig Iron

| | Mar. 9, 1946 | Feb., 1946 | Dec., 1945 | Mar., 1945 |
|---|---|---|---|---|
| Bessemer, del. Pittsburgh | $26.94 | $26.94 | $26.94 | $26.19 |
| Basic, Valley | 25.25 | 25.25 | 25.25 | 24.50 |
| Basic, eastern del. Philadelphia | 27.09 | 27.09 | 27.09 | 26.34 |
| No. 2 fdry., del. Philadelphia | 27.59 | 27.59 | 27.59 | 26.84 |
| No. 2 foundry, Chicago | 25.75 | 25.75 | 25.75 | 25.00 |
| Southern No. 2, Birmingham | 22.13 | 22.13 | 22.13 | 21.38 |
| Southern No. 2 del. Cincinnati | 26.05 | 26.05 | 26.05 | 25.30 |
| No. 2 fdry., del. Philadelphia | 27.59 | 27.59 | 27.59 | 26.34 |
| Malleable, Valley | 25.75 | 25.75 | 25.75 | 25.00 |
| Malleable, Chicago | 25.75 | 25.75 | 25.75 | 25.00 |
| Lake Sup., charcoal del. Chicago | 37.34 | 37.34 | 37.34 | 37.34 |
| Gray forge, del. Pittsburgh | 25.94 | 25.94 | 25.94 | 25.19 |
| Ferromanganese, del. Pittsburgh | 140.00 | 140.00 | 140.00 | 140.33 |

## Scrap

| | | | | |
|---|---|---|---|---|
| Heavy melting steel, No. 1, Pittsburgh | $20.00 | $20.00 | $20.00 | $20.00 |
| Heavy melt. steel, No. 2, E. Pa. | 18.75 | 18.75 | 18.75 | 18.75 |
| Heavy melting steel, Chicago | 18.75 | 18.75 | 18.75 | 18.75 |
| Rails for rolling, Chicago | 22.25 | 22.25 | 22.25 | 22.25 |
| No. 1 cast, Chicago | 20.00 | 20.00 | 20.00 | 20.00 |

## Coke

| | | | | |
|---|---|---|---|---|
| Connellsville, furnace ovens | $7.50 | $7.50 | $7.50 | $7.00 |
| Connellsville, foundry ovens | 8.25 | 8.25 | 8.25 | 7.75 |
| Chicago, by-product fdry, del. | 13.35 | 13.75 | 13.75 | 13.35 |

## STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941, Feb. 4, 1942, May 21, 1945, Mar. 1, 1946. Schedule covers iron or steel ingots, semifinished iron or steel products, finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. Seconds and off-grade products are also covered. Exceptions applying to individual companies are noted in the table. Finished steel quoted in cents per pound.

### Semifinished Steel

**Gross ton basis except wire rods, skelp.**

**Carbon Steel Ingots:** F.o.b. mill base, rerolling qual., stand. analysis, $33.
(Empire Sheet & Tin Plate Co., Mansfield, O. may quote carbon steel ingots at $33 gross ton, f.o.b. mill.)

**Alloy Steel Ingots:** Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon; uncrop. $46.80.

**Rerolling, Billets, Blooms, Slabs:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $39; Detroit, del., $41; Duluth (bil), $41; Pac. ports (bil), $51. (Andrews Steel Co., carbon slabs, $41; Continental Steel Corp., billets $34, Kokomo, to Acme Steel Co.; Northwestern Steel & Wire Co., $41, Sterling, Ill.; Laclede Steel Co., $34 Alton or Madison, Ill.; Wheeling Steel Corp. $36 base, billets for lend-lease, $34, Portsmouth, O., on slabs on WPB directives. Granite City Steel Co. $47.50 gross ton slabs from D.P.C. mill. Geneva Steel Co. $58.64, Pac. ports.)

**Forging Quality Blooms, Slabs, Billets:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $47; Detroit, del., $49; Duluth, billets, $49; forg. bil. f.o.b. Pac. ports, $59.
(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points; Follansbee Steel Corp., $49.50 f.o.b. Toronto, O. Geneva Steel Co. $64.64, Pacific ports.)

**Alloy Billets, Slabs, Blooms:** Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $56.16, del. Detroit $58.16, eastern Mich. $59.16.

**Sheet Bars:** Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $38. (Wheeling Steel Corp. $37 on lend-lease sheet bars, $38 Portsmouth, O., on WPB directives; Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, f.o.b. mill.)

**Skelp:** Pittsburgh, Chicago, Sparrows Point, Youngstown, Coatesville, lb., 2.05c.

**Wire Rods:** Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—5/32 in. inclusive, per 100 lbs., $2.30. Do., over 5/32—47/64-in., incl., $2.45; Galveston, base, $2.40 and $2.55, respectively. Worcester add $0.10; Pacific ports $0.50 (Pittsburgh Steel Co., $0.05 higher.)

### Bars

**Hot-Rolled Carbon Bars and Bar-Size Shapes under 3:** Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham base, 20 tons one size, 2.50c; Duluth, base, 2.60c; Detroit, del., 2.60c; eastern Mich., 2.65c; New York, del., 2.84c; Phila., del., 2.82c; Gulf ports, dock; 2.87c; Pac. ports, dock, 3.15c. (Calumet Steel Division, Borg-Warner Corp., and Joslyn Mfg. & Supply Co., may quote 2.55c, Chicago base; Sheffield Steel Corp., 2.75c, f.o.b. St. Louis.)

**Rail Steel Bars:** Same prices as for hot-rolled carbon bars except base is 5 tons.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.)

**Hot-Rolled Alloy Bars:** Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.92c; Detroit, del., 3.02c. (Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

| AISI Series | (*Basic O-H) | AISI Series | (*Basic O-H) |
|---|---|---|---|
| 1300 | $0.104 | 4300 | 1.768 |
| 2300 | 1.768 | 4600 | 1.248 |
| 2500 | 2.652 | 4800 | 2.236 |
| 3000 | 0.52 | 5100 | 0.364 |
| 3100 | 0.884 | 5130 or 5152 | 0.468 |
| 3200 | 1.404 | 6120 or 6152 | 0.988 |
| 3400 | 3.328 | 6145 or 6150 | 1.248 |
| 4000 | 0.468 | 8612 | 0.676 |
| 4100 (.15-.25 Mo) | 0.728 | 8720 | 0.728 |
| (.20-.30 Mo) | 0.78 | 9830 | 1.352 |

* Add 0.25 for acid open-hearth; 0.50 electric.

**Cold-Finished Carbon Bars:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 20,000-39,999 lbs., 3.10c; Detroit, 3.15c; Toledo, 3.25c. (Keystone Drawn Steel Co. may sell outside its usual market area on Proc. Div., Treasury Dept., contracts at 2.65c, Spring City, Pa., plus freight on hot-rolled bars from Pittsburgh to Spring City, New England Drawn Steel Co. may sell outside New England on WPB directives at 2.65c, Mansfield, Mass., plus freight on hot-rolled bars from Buffalo to Mansfield.)

**Cold-Finished Alloy Bars:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 3.35c; Detroit, del., 3.45c; eastern Mich., 3.50c.

**Reinforcing Bars (New Billet):** Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.35c; Detroit, del., 2.45c; eastern Mich. and Toledo, 2.50c; Gulf ports, dock, 2.70c; Pacific ports, dock, 2.75c.

**Reinforcing Bars (Rail Steel):** Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo, base, 2.35c; Detroit, del., 2.45c; eastern Mich. and Toledo, 2.50c; Gulf ports, dock, 2.70c.

**Iron Bars:** Single refined, Pitts., 4.76c; double refined, 5.84c; Pittsburgh, staybolt, 6.22c; Terre Haute, single ref., 5.42c; double ref., 6.76c.

### Sheets, Strip

**Hot-Rolled Sheets:** Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base, 2.425c; Granite City, base, 2.525c; Detroit, del., 2.525c; eastern Mich., 2.575c; Phila., del., 2.595c; New York, del., 2.665c; Pacific ports, 2.975c.
(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O., base; Alan Wood Steel Co., Conshohocken, Pa., may quote 2.35c on hot carbon sheets, nearest eastern basing point.)

**Cold-Rolled Sheets:** Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.275c; Granite City, base, 3.425c; Detroit, del., 3.375c; eastern Mich., 3.425c; New York, del., 3.615c; Phila., del., 3.595c; Pacific ports, 3.925c.

**Galvanized Sheets, No. 24:** Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base, 4.05c; Granite City, base, 4.15c; New York, del., 4.29c; Phila., del., 4.13c; Pacific ports, 4.60c. (Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

**Corrugated Galv. Sheets:** Pittsburgh, Chicago, Gary, Birmingham, 29-gage, per square, 3.75c.

**Culvert Sheets:** Pittsburgh, Chicago, Gary, Birmingham, 16-gage not corrugated, copper alloy, 4.11c; Granite City, 4.22c; Pacific ports, 4.60c; copper iron, 4.22c; pure iron, 4.27c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh, 4.60c.

**Enameling Sheets: 10-gage;** Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 3.20c; Granite City, base 3.30c; Detroit, del., 3.30c; eastern Mich., 3.35c; Pacific ports, 3.85c; 20-gage: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 3.80c; Detroit, del., 3.90c; eastern Mich., 3.95c; Pacific ports, 4.45c.

**Electrical Sheets No. 24:**

| | Pittsburgh Base | Pacific Ports | Granite City |
|---|---|---|---|
| Field grade | 3.90c | 4.65c | 4.00c |
| Armature | 4.25c | 5.00c | 4.35c |
| Electrical | 4.75c | 5.50c | 4.85c |
| Motor | 5.425c | 6.175c | 5.525c |
| Dynamo | 6.125c | 6.875c | 6.225c |
| Transformer | | | |
| 72 | 6.625c | 7.375c | ..... |
| 65 | 7.625c | 8.375c | ..... |
| 58 | 8.125c | 8.875c | ..... |
| 52 | 8.925c | 9.675c | ..... |

**Hot-Rolled Strip:** Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown base, 6-inch and narrower, 2.45c; Detroit, del., 2.55c; eastern Mich., 2.60c; Pacific ports, 3.10c; under 6-inch, base, 2.35c; Detroit, del., 2.45c; eastern Mich., 2.50c; Pacific ports, 3.00c.

**Cold Rolled Strip:** Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less, 3.05c; Chicago, base, 3.15c; Detroit, del., 3.15c; eastern Mich., 3.20c; Worcester, base, 3.25c.

**Cold Finished Spring Steel:** Pittsburgh, Cleveland, bases, add 20c for Worcester; .26-.50 Carb., 3.05c.

## Tin, Terne Plate

**Tin Plate:** Pittsburgh, Chicago, Gary, 100-lb. base box, $5.25; Granite City, Birmingham, Sparrows Point, $5.35.

**Electrolytic Tin Plate:** Pittsburgh, Gary, 100-lb. base box, 0.25 lb. tin, $4.60; 0.50 lb. tin, $4.75; 0.75 lb. tin, $4.90; Granite City, Birmingham, Sparrows Point, $4.70, $4.85, $5.00, respectively.

**Tin Mill Black Plate:** Pittsburgh, Chicago, Gary, base 29-gage and lighter, 3.30c; Granite City, Birmingham, Sparrows Point, 3.40c; Pacific ports, boxed, 4.30c.

**Long Ternes:** Pittsburgh, Chicago, Gary, No. 24 unassorted, 4.05c; Pacific ports, 4.80c.

**Manufacturing Ternes (Special Coated):** Pittsburgh, Chicago, Gary, 100-base box, $4.55; Granite City, Birmingham, Sparrows Point: $4.65.

**Roofing Ternes:** Pittsburgh base per package 112 sheets; 20 x 28 in., coating I. C. 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16; 30-lb. $17.25; 40-lb. $19.50.

## Plates

**Carbon Steel Plates:** Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.50c; New York, del., 2.69c; Phila., del., 2.55c; St. Louis, 2.74c; Boston, del., 2.82-3.07c; Pacific ports, 3.05c; Gulf ports, 2.85c.

(Granite City Steel Co. may quote carbon plates 2.35c f.o.b. mill; 2.65c f.o.b. D.P.C. mill; Central Iron & Steel Co. 2.50c f.o.b. basing points; Geneva Steel Co., Provo, Utah, 3.20c f.o.b. Pac. ports.)

**Floor Plates:** Pittsburgh, Chicago, 3.75c; Pacific ports, 4.40c; Gulf ports, 4.10c.

**Open-Hearth Alloy Plates:** Pittsburgh, Chicago, Coatesville, 3.75c; Gulf ports, 4.20c; Pacific ports, 4.40c.

## Shapes

**Structural Shapes:** Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.35c; New York, del., 2.52c; Phila., del., 2.465c; Pacific ports, 3.00c; Gulf ports, 2.70c.

(Phoenix Iron Co., Phoenixville, Pa., may quote the equivalent of 2.45c, Bethlehem, Pa., on the general range and 2.55c on beams and channels from 4 to 10 inches.)

**Steel Piling:** Pittsburgh, Chicago, Buffalo, 2.65c; Pacific ports, 3.20c.

## Wire Products, Nails

**Wire:** Pittsburgh, Chicago, Cleveland, Birmingham to manufacturers in carloads.

Bright, basic, bessemer wire ..... *$3.05

Spring wire ..... *‡$3.65

**Wire Products to the Trade:**

Standard and cement-coated wire nails, and staples, 100-lb. keg, Pittsburgh, Chicago, Birmingham, Cleveland, $3.25; Worcester, $3.55; Pac. ports, $3.75; galvanized, $2.90 and $3.40, resp.

Annealed Merchant quality wire, 100-lb., Pittsburgh, Chicago, Cleveland Birmingham ..... ††$3.50

Galvanized Merchant quality wire, 100-lb., Pittsburgh, Chicago, Cleveland, Birmingham ..... ††$3.85

Woven fence, 15½ gage and heavier, per base column ..... 72

Barbed wire, 80-rod spool, Pittsburgh, Chicago, Cleveland, Birmingham, column 79; twisted barbless wire, column 79.

* Add $0.10 for Worcester, $0.05 for Duluth; add $0.50 for bright, annealed, galvanized and $0.70 for other finishes for Pacific ports.

‡ Same bases as for bright basic except Birmingham.

### PRICES REVISED

In conformity with specific steel product price increases effected by the Office of Price Administration, announced March 1, price listing on these pages have been adjusted upward to reflect the changes, except in those instances where further clarification by OPA or the trade is necessary for correct interpretation of the OPA order.

In a number of products specific prices are yet to be announced. Also, in the case of rails, prices now are quoted on the basis of net tons.

†† Add 10 cents for Worcester; 50 cents for annealed, bright basic and 70 cents for all other finishes for Pacific ports.

## Tubular Goods

**Welded Pipe:** Base price in carloads, threaded and coupled to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

**Butt Weld**

| | Steel | | | Iron | |
|---|---|---|---|---|---|
| In. | Blk. | Galv. | In. | Blk. | Galv. |
| ⅛ | 53 | 30 | ½ | 21 | 0½ |
| ¼ & ⅜ | 56 | 37½ | ¾ | 27 | 7 |
| ½ | 60½ | 48 | 1-1¼ | 31 | 13 |
| ¾ | 63½ | 52 | 1½ | 35 | 15½ |
| 1-3 | 65½ | 54½ | 2 | 34½ | 15 |

**Lap Weld**

| | Steel | | | Iron | |
|---|---|---|---|---|---|
| In. | Blk. | Galv. | In. | Blk. | Galv. |
| 2 | 58 | 46½ | 1¼ | 20 | 0½ |
| 2½-3 | 61 | 51½ | 1½ | 25½ | 7 |
| 3½-6 | 63 | 51½ | 2 | 27½ | 9 |
| 7-8 | 62 | 49½ | 2½-3½ | 28½ | 11½ |
| 9-10 | 61½ | 49 | 4 | 30½ | 15 |
| 11-12 | 60½ | 48 | 4½-8 | 29½ | 14 |
| | | | 9-12 | 25½ | 9 |

**Boiler Tubes:** Net base prices per 100 feet f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

| | —Seamless— | | | —Lap Weld— | |
|---|---|---|---|---|---|
| O.D. sizes | B.W.G. | Hot Rolled | Cold Drawn | Steel | Charcoal Iron |
| 1" | 13 | ..... | $ 9.01 | ..... | ..... |
| 1¼" | 13 | ..... | 10.67 | ..... | ..... |
| 1½" | 13 | $10.23 | 11.72 | $ 9.72 | $23.71 |
| 1¾" | 13 | 11.64 | 13.42 | 11.06 | 22.93 |
| 2" | 13 | 13.04 | 15.03 | 12.38 | 19.35 |
| 2¼" | 13 | 14.54 | 16.76 | 13.79 | 21.63 |
| 2½" | 12 | 16.01 | 18.45 | 15.16 | ..... |
| 2½" | 12 | 17.54 | 20.21 | 16.58 | 26.57 |
| 2¾" | 12 | 18.59 | 21.42 | 17.54 | 29.00 |
| 3" | 12 | 19.50 | 22.48 | 18.35 | 31.38 |
| 3½" | 11 | 24.63 | 28.37 | 23.15 | 39.81 |
| 4" | 10 | 30.54 | 35.20 | 28.66 | 49.90 |
| 4½" | 10 | 37.35 | 43.04 | 35.22 | ..... |
| 5" | 9 | 46.87 | 54.01 | 44.25 | 73.93 |
| 6" | 7 | 71.96 | 82.93 | 68.14 | ..... |

## Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, net ton, $43.39. Light rails (billet), Pittsburgh, Chicago, Birmingham, net ton, $49.18.

*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $31-$33.

Supplies: Track bolts, 4.75c; heat treated, 5.00c. Tie plates $51 net ton, base. Standard spikes, 3.65c.

* Fixed by OPA Schedule No. 46, Dec. 15, 1941.

## Tool Steels

**Tool Steels:** Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb.: Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.

| Tung. | Chr. | Van. | Moly. | Base, per lb. |
|---|---|---|---|---|
| 18.00 | 4 | 1 | ... | 67.05c |
| 1.5 | 4 | 1 | 8.5 | 54.04c |
| .... | 4 | 2 | 3 | 54.04c |
| 6.40 | 4.15 | 1.90 | 5 | 62.20c |
| 5.50 | 4.50 | 4 | 4.50 | 75.74c |

## Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham.

Structural ..... 3.75c

⅞-inch and under ..... 65.-5 off

Wrought, Washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l. ..$2.75.-3.00 off

## Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%

**Carriage and Machine**

½ x 6 and smaller ..... 65½ off

Do., ⅞ and ⅝ x 6-in. and shorter.. 63½ off

Do., ¾ to 1 x 6-in. and shorter .... 61 off

1⅛ and larger, all lengths ..... 59 off

All diameters, over 6-in. long ..... 59 off

Tire bolts ..... 50 off

Step bolts ..... 56 off

Plow bolts ..... 65 off

**Stove Bolts**

In packages with nuts separate 71-10 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

**Nuts**

| Semifinished hex | U.S.S. | S.A.E. |
|---|---|---|
| ⅞-inch and less | 62 | 64 |
| ½-1-inch | 59 | 60 |
| 1⅛-1½-inch | 57 | 58 |
| 1⅝ and larger | 56 | .. |

**Hexagon Cap Screws**

Upset 1-in., smaller ..... 64 off

Milled 1-in., smaller ..... 60 off

**Square Head Set Screws**

Upset, 1-in., smaller ..... 71 off

Headless, ¼-in., larger ..... 60 off

No. 10 smaller ..... 70 off

## Stainless Steels

Base, Cents per lb.

| Type | Bars | Plates | Sheets | H. R. Strip | C. R. Strip |
|---|---|---|---|---|---|
| **CHROMIUM NICKEL STEEL** | | | | | |
| 302 | 24.00c | 27.00c | 34.00c | 21.50c | 28.00c |
| 303 | 26.00 | 29.00 | 36.00 | 27.00 | 33.00 |
| 304 | 25.00 | 29.00 | 36.00 | 23.50 | 30.00 |
| 308 | 29.00 | 34.00 | 41.00 | 28.50 | 35.00 |
| 309 | 36.00 | 40.00 | 47.00 | 37.00 | 47.00 |
| 310 | 49.00 | 52.00 | 53.00 | 48.75 | 56.00 |
| 312 | 36.00 | 40.00 | 49.00 | ..... | ..... |
| *316 | 40.00 | 44.00 | 48.00 | 40.00 | 48.00 |
| †321 | 29.00 | 34.00 | 41.00 | 29.25 | 38.00 |
| †347 | 33.00 | 38.00 | 45.00 | 33.00 | 42.00 |
| 431 | 19.00 | 22.00 | 29.00 | 17.50 | 22.50 |
| **STRAIGHT CHROMIUM STEEL** | | | | | |
| 403 | 21.50 | 24.50 | 29.50 | 21.25 | 27.00 |
| **410 | 18.50 | 21.50 | 26.50 | 17.60 | 22.00 |
| 416 | 19.00 | 22.00 | 27.00 | 18.25 | 23.50 |
| ††420 | 24.00 | 28.50 | 33.50 | 23.75 | 36.50 |
| 430 | 19.00 | 22.00 | 29.00 | 17.50 | 22.50 |
| ††430F | 19.50 | 22.50 | 29.50 | 18.75 | 24.50 |
| 440A | 24.00 | 28.50 | 33.50 | 23.75 | 36.50 |
| 442 | 22.50 | 25.50 | 32.50 | 24.00 | 32.00 |
| 443 | 22.50 | 25.50 | 32.50 | 24.00 | 32.00 |
| 446 | 27.50 | 30.50 | 36.50 | 35.00 | 52.00 |
| 501 | 8.00 | 12.00 | 15.75 | 12.00 | 17.00 |
| 502 | 9.00 | 13.00 | 16.75 | 13.00 | 18.00 |
| **STAINLESS CLAD STEEL (20%)** | | | | | |
| 304 | §§18.00 | 19.00 | ..... | ..... | |

*With 2-3% moly. §With titanium. †With columbium. **Plus machining agent. ††High carbon. ††Free machining. §§Includes annealing and pickling.

## Metallurgical Coke

Price Per Net Ton

**Beehive Ovens**

Connellsville, furnace ..... *7.50

Connellsville, foundry ..... 8.00- 8.50

New River, foundry ..... 9.00- 9.25

Wise county, foundry ..... 7.75- 8.25

Wise county, furnace ..... 7.25- 7.75

**By-Product Foundry**

Kearney, N. J., ovens ..... 13.05

Chicago, outside delivered ..... 13.00

Chicago, delivered ..... 13.75

Terre Haute, delivered ..... 13.50

Milwaukee, ovens ..... 13.75

New England, delivered ..... 14.65

St. Louis, delivered ..... †13.75

Birmingham, delivered ..... 10.90

Indianapolis, delivered ..... 13.50

Cincinnati, delivered ..... 13.25

Cleveland, delivered ..... 13.20

Buffalo, delivered ..... 13.40

Detroit, delivered ..... 13.75

Philadelphia, delivered ..... 13.28

*Operators of hand-drawn ovens using trucked coal may charge $8.00; effective May 28, 1945.

†14.25 from other than Ala., Mo., Tenn.

## Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol ..... 15.00c

Toluol, two degree ..... 27.00c

Solvent naphtha ..... 26.00c

Industrial xylol ..... 26.00c

Per lb. f.o.b. works

Phenol (car lots, returnable drums) ... 10.50c

Do., less than car lots ..... 11.25c

Do., tank cars ..... 9.50c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls., to jobbers ..... 8.00c

Per ton, bulk, f.o.b. port

Sulphate of ammonia ..... $29.20

# WAREHOUSE STEEL PRICES

Base delivered price, cents per pound, for delivery within switching limits, subject to established extras. Quotations based on OPA mill prices announced March 1, 1946.

| | Hot rolled bars | Structural shapes | Plates | Floor plates | Hot rolled sheets (10 gage base) | Hot-rolled strip | Galvanized flat sheets (24 gage base) | Cold-rolled sheets (17 gage base)) | Cold finished bars | Cold-rolled strip |
|---|---|---|---|---|---|---|---|---|---|---|
| Boston | 4.294[1] | 4.162[1] | 4.162[1] | 5.977[1] | 3.999[1] | 5.456[1] | 5.674[14] | 4.969[14] | 4.594[21] | 4.965 |
| New York | 4.103[1] | 4.008[1] | 3.018[1] | 5.824[1] | 3.815[1] | 4.324[1] | 5.460[13] | 4.838[14] | 4.553[21] | 5.024 |
| Jersey City | 4.103[1] | 3.997[1] | 3.018[1] | 5.824[1] | 3.815[1] | 4.324[1] | 5.460[13] | 4.838[14] | 4.553[21] | 5.024 |
| Philadelphia | 4.072[1] | 3.916[1] | 3.855[1] | 3.768[1] | 3.743[1] | 4.622[1] | 5.468[16] | 5.097[25] | 4.022[21] | 5.022 |
| Baltimore | 4.052[1] | 4.009[1] | 3.844[1] | 5.502[1] | 3.619[1] | 4.602[1] | 5.344[1] | 5.077[25] | 4.502[21] | ..... |
| Washington | 4.191[1] | 4.180[1] | 4.046[1] | 5.591[1] | 3.821[1] | 4.741[1] | 5.646[17] | 5.066[20] | 4.491[21] | ..... |
| Norfolk, Va. | 4.315[1] | 4.252[1] | 4.221[1] | 5.715[1] | 3.996[1] | 4.865[1] | 5.821[17] | 4.490[24] | 4.615[21] | ..... |
| Bethlehem, Pa.* | ..... | 3.70[1] | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Claymont, Del. | ..... | ..... | 3.70[1] | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Coatesville, Pa. | ..... | ..... | 3.70[1] | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Buffalo (city) | 3.60[1] | 3.65[1] | 3.88[1] | 5.51[1] | 3.575[1] | 4.169[1] | 5.20[15] | 4.625[16] | 4.20[21] | 4.919 |
| Buffalo (country) | 3.50[1] | 3.55[1] | 3.55[1] | 5.15[1] | 3.475[1] | 3.85[1] | 5.10[15] | 4.525[19] | 4.10[21] | 4.60 |
| Pittsburgh (city) | 3.60[1] | 3.65[1] | 3.65[1] | 5.25[1] | 3.575[1] | 3.95[1] | 5.20[13] | 4.625[24] | 4.20[21] | ..... |
| Pittsburgh (country) | 3.50[1] | 3.55[1] | 3.55[1] | 5.15[1] | 3.475[1] | 3.85[1] | 5.10[13] | 4.525[24] | 4.10[21] | ..... |
| Cleveland (city) | 3.60[1] | 3.838[1] | 3.65[1] | 5.438[1] | 3.575[1] | 3.95[1] | 5.327[13] | 4.625[24] | 4.20[21] | 4.70 |
| Cleveland (country) | 3.50[1] | ..... | 3.55[1] | ..... | 3.475[1] | 3.85[1] | ..... | 4.525[24] | 4.10[21] | 4.60 |
| Detroit | 3.70[1] | 3.911[1] | 3.859[1] | 5.531[1] | 3.675[1] | 4.050[1] | 5.450[13] | 4.725[24] | 4.25[17] | 4.909 |
| Omaha (city, del.) | 4.293[1] | 4.343[1] | 4.343[1] | 5.943[1] | 4.018[1] | 4.493[1] | 6.065[13] | 5.668[24] | 4.893[21] | ..... |
| Omaha (country, base) | 4.193[1] | 4.243[1] | 4.243[1] | 5.843[1] | 3.918[1] | 4.393[1] | 5.965[13] | ..... | ..... | ..... |
| Cincinnati | 3.861[1] | 3.941[1] | 3.911[1] | 5.541[1] | 3.650[1] | 4.025[1] | 5.275[13] | 4.700[24] | 4.461[21] | 4.961 |
| Youngstown | ..... | ..... | ..... | ..... | ..... | ..... | 4.85[13] | ..... | ..... | ..... |
| Middletown, O. | ..... | ..... | ..... | ..... | 3.475[1] | 3.85[1] | 5.10[16] | ..... | ..... | ..... |
| Chicago (city) | 3.75[1] | 3.80[1] | 3.80[1] | 5.40[1] | 3.475[1] | 3.95[1] | 5.681[15] | 4.425[24] | 4.20[21] | 4.90 |
| Milwaukee | 3.887[1] | 3.937[1] | 3.937[1] | 5.537[1] | 3.612[1] | 4.087[1] | 5.722[15] | 4.562[24] | 4.337[21] | 5.037 |
| Indianapolis | 3.83[1] | 3.88[1] | 3.88[1] | 5.48[1] | 3.743[1] | 4.118[1] | 5.368[15] | 4.793[24] | 4.43[21] | 5.030 |
| St. Paul | 4.01[2] | 4.06[2] | 4.06[2] | 5.66[2] | 3.735[2] | 4.21[2] | 5.707[15] | 4.685[24] | 4.811[21] | 5.352 |
| St. Louis | 3.924[1] | 3.947[1] | 3.947[1] | 5.547[1] | 3.622[1] | 4.097[11] | 5.622[15] | 4.572[24] | 4.481[21] | 5.181 |
| Memphis, Tenn. | 4.265[1] | 4.315[1] | 4.315[1] | 6.03[1] | 4.190[1] | 4.565[1] | 5.715[15] | 5.005[24] | 4.78[21] | ..... |
| Birmingham | 3.75[1] | 3.80[1] | 3.80[1] | 6.153[1] | 3.675[1] | 4.05[1] | 5.20[15] | 5.077[24] | 4.99[21] | 5.465 |
| New Orleans (city) | 4.35[4] | 4.15[4] | 4.15[4] | 6.10[4] | 4.283[4] | 4.55[4] | 5.70[26] | 5.304[19] | 5.05[21] | 5.679 |
| Houston, Tex. | 4.00[3] | 4.50[1] | 4.50[1] | 5.75[9] | 3.988[3] | 4.663[3] | 5.763[26] | 5.819[19] | 4.10[22] | ..... |
| Los Angeles | 4.65[4] | 4.90[4] | 5.20[4] | 7.45[4] | 5.225[4] | 7.10[4] | 6.45[12] | 7.425[8] | 6.033[22] | 5.863 |
| San Francisco | 4.40[7] | 4.60[7] | 4.90[7] | 6.60[7] | 4.775[7] | 6.10[7] | 6.80[18] | 7.525[15] | 5.783[21] | 7.583 |
| Portland, Oreg. | 4.70[27] | 4.70[27] | 5.00[27] | 6.75[27] | 4.875[27] | 6.65[27] | 6.20[16] | 6.825[15] | 5.983[15] | ..... |
| Tacoma, Wash. | 4.60[6] | 4.70[6] | 5.00[6] | 6.75[6] | 4.875[6] | 5.80[6] | 6.40[15] | 7.825[15] | 6.233[21] | ..... |
| Seattle | 4.70[6] | 4.70[6] | 5.00[6] | 6.75[6] | 4.875[6] | 5.80[6] | 6.40[15] | 7.275[15] | 6.233[21] | ..... |

*Basing point cities with quotations representing mill prices, plus warehouse spread.

NOTE—All prices fixed by Office of Price Administration in Amendments Nos. 10 to 33 to Revised Price Schedule No. 49. Deliveries outside above cities computed in accordance with regulations.

BASE QUANTITIES

[1]—400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—100 to 8999 pounds; [6]—300 to 9999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds; [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles; [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [18]—one to six bundles; [19]—100 to 749 pounds; [20]—300 to 1999 pounds; [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [25]—1000 to 1999 pounds; [26]—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, base; [27]—300 to 4999 pounds.

## Ores

### Lake Superior Iron Ore

*Gross ton, 51½% (Natural)*
*Lower Lake Ports*

| | |
|---|---|
| Old range bessemer | $4.95 |
| Mesabi nonbessemer | 4.55 |
| High phosphorus | 4.35 |
| Mesabi bessemer | 4.70 |
| Old range nonbessemer | 4.80 |

### Eastern Local Ore

*Cents, units, del. E. Pa.*

| | |
|---|---|
| Foundry and basic 56-63% contract | 13.00 |

### Foreign Ore

*Cents per unit, c.i.f. Atlantic ports*

| | |
|---|---|
| Manganiferous ore, 45-55% Fe., 6-10% Mang. | Nom. |
| N. African low phos. | Nom. |
| Swedish basic, 60 to 68% | Nom. |
| Spanish. No. African basic. 50 to 60% | Nom. |
| Brazil iron ore, 68-69% f.o.b. Rio de Janeiro | 7.50-8.00 |

### Tungsten Ore

| | |
|---|---|
| Chinese Wolframite, per short ton unit, duty paid | $24.00 |

### Chrome Ore

(Equivalent OPA schedules):

*Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash.*

*(S S paying for discharge; dry basis, subject to penalties if guarantees are not net.)*

Indian and African

| | |
|---|---|
| 48% 2.8:1 | $39.75 |
| 48% 3:1 | 41.00 |
| 48% no ratio | 31.00 |

South African (Transvaal)

| | |
|---|---|
| 44% no ratio | $27.40 |
| 45% no ratio | 28.30 |
| 48% no ratio | 31.00 |
| 50% no ratio | 32.80 |

Brazilian—nominal

| | |
|---|---|
| 44% 2.5:1 lump | 33.65 |
| 48% 3:1 lump | 43.50 |

Rhodesian

| | |
|---|---|
| 45% no ratio | 28.30 |
| 48% no ratio | 31.00 |
| 48% 3:1 lump | 41.00 |

Domestic (seller's nearest rail)

| | |
|---|---|
| 48% 3:1 | 52.80 |

less $7 freight allowance.

### Manganese Ore

Sales prices of Metals Reserve Co., cents per gross ton unit, dry, 48%, at New York, Philadelphia, Baltimore, Norfolk, Mobile and New Orleans, 85.0c; Fontana, Calif., Provo, Utah, and Pueblo, Colo., 91.0c; prices include duty on imported ore and are subject to premiums, penalties and other provisions of amended M.P.R. No. 248, effective as of May 15. Price at basing points which are also points of discharge of imported manganese ore is f.o.b. cars, shipside, at dock most favorable to the buyer. Outside shipments direct to consumers at 10c per unit less than Metal Reserve Co. prices.

### Molybdenum

| | |
|---|---|
| Sulphide conc., lb., Mo. cont., mines | $0.75 |

## NATIONAL EMERGENCY STEELS (Hot Rolled)

*(Extras for alloy content)*

| Designation | Chemical Composition Limits, Per Cent: Carbon | Mn. | Si. | Cr. | Ni. | Mo. | Basic open-hearth Electric furnace: Bars per 100 lb. | Billets per GT | Bars per 100 lb. | Billets per GT |
|---|---|---|---|---|---|---|---|---|---|---|
| NE 9415 | .13-.18 | .80-1.10 | .20-.35 | .30-.50 | .30-.60 | .08-.15 | $0.75 | $15.00 | $1.25 | $25.00 |
| NE 9425 | .23-.28 | .80-1.20 | .20-.35 | .30-.50 | .30-.60 | .08-.15 | .75 | 15.00 | 1.25 | 25.00 |
| NE 9442 | .40-.45 | 1.00-1.30 | .20-.35 | .30-.50 | .30-.60 | .08-.15 | .80 | 16.00 | 1.30 | 26.00 |
| NE 9722 | .20-.25 | .50-.80 | .20-.35 | .10-.25 | .40-.70 | .15-.25 | .65 | 13.00 | 1.15 | 23.00 |
| NE 9912 | .10-.15 | .50-.70 | .20-.35 | .40-.60 | 1.00-1.30 | .20-.30 | 1.20 | 24.00 | 1.55 | 31.00 |
| NE 9920 | .18-.23 | .50-.70 | .20-.35 | .40-.60 | 1.00-1.30 | .20-.30 | 1.20 | 24.00 | 1.55 | 31.00 |

Extras are in addition to a base price of 2.70c, per pound on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

## Pig Iron

Prices (in gross tons) are maximum fixed by OPA Price Schedule No. 10, effective June 10, 1941, amended Feb. 14, and Oct. 22, 1945. Exceptions indicated in footnotes. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included.

| | Foundry | Basic | Bessemer | leable Mal- |
|---|---|---|---|---|
| **Bethlehem, Pa., base** | $26.75 | $26.25 | $27.75 | $27.25 |
| Newark, N. J., del. | 28.28 | 27.78 | 29.28 | 28.78 |
| Brooklyn, N. Y., del. | 29.25 | ..... | ..... | 29.75 |
| **Birdsboro, Pa., base** | 26.75 | 26.25 | 27.75 | 27.25 |
| **Birmingham, base** | 22.13 | 20.75 | 26.75 | ..... |
| Baltimore, del. | 27.36 | ..... | ..... | ..... |
| Boston, del. | 26.89 | ..... | ..... | ..... |
| Chicago, del. | 25.97 | ..... | ..... | ..... |
| Cincinnati, del. | 25.81 | 24.48 | ..... | ..... |
| Cleveland, del. | 25.87 | 24.99 | ..... | ..... |
| Newark, N. J. | 27.90 | ..... | ..... | ..... |
| Philadelphia, del. | 27.21 | 26.71 | ..... | ..... |
| St. Louis, del. | 25.87 | 24.99 | ..... | ..... |
| **Buffalo, base** | 25.75 | 24.75 | 26.75 | 26.25 |
| Boston, del. | 27.25 | 26.75 | 28.25 | 27.75 |
| Rochester, del. | 27.28 | ..... | 28.28 | 27.78 |
| Syracuse, del. | 27.83 | ..... | 28.83 | 28.33 |
| **Chicago, base** | 25.75 | 25.25 | 26.25 | 25.75 |
| Milwaukee, del. | 26.85 | 26.35 | 27.35 | 26.85 |
| Muskegon, Mich., del. | 28.94 | ..... | ..... | 28.94 |
| **Cleveland, base** | 25.75 | 25.25 | 26.25 | 25.75 |
| Akron, Canton, del. | 27.14 | 26.64 | 27.64 | 27.14 |
| **Detroit, base** | 25.75 | 25.25 | 26.25 | 25.75 |
| Saginaw, Mich., del. | 28.06 | 27.56 | 28.56 | 28.06 |
| **Duluth, base** | 26.25 | 25.75 | 26.75 | 26.25 |
| St. Paul, del. | 28.38 | 27.88 | 28.88 | 28.38 |
| **Erie, Pa., base** | 25.75 | 25.25 | 26.75 | 26.25 |
| **Everett, Mass., base** | 26.75 | 26.25 | 27.75 | 27.25 |
| Boston, del. | 27.25 | 26.75 | 28.25 | 27.75 |
| **Granite City, Ill., base** | 25.75 | 25.25 | 26.25 | 25.75 |
| St. Louis, del. | 26.25 | 25.75 | ..... | 26.25 |
| **Hamilton, O., base** | 25.75 | 25.25 | ..... | 25.75 |
| Cincinnati, del. | 26.19 | 26.36 | ..... | 26.86 |
| **Neville Island, Pa., base** | 25.75 | 25.25 | 26.25 | 25.75 |
| §Pittsburgh, del. No. & So. sides | 26.44 | 25.94 | 26.94 | 26.44 |
| **Provo, Utah, base** | 23.75 | 23.25 | ..... | ..... |
| **Sharpsville, Pa., base** | 25.75 | 25.25 | 26.25 | 25.75 |
| **Sparrows Point, base** | 26.75 | 26.25 | ..... | ..... |
| Baltimore, del. | 27.74 | ..... | ..... | ..... |
| **Steelton, Pa., base** | ..... | 26.25 | ..... | ..... |
| **Swedeland, Pa., base** | 26.75 | 26.25 | 27.75 | 27.25 |
| Philadelphia, del. | 27.59 | 27.09 | ..... | 28.09 |
| **Toledo, O., base** | 25.75 | 25.25 | 26.25 | 25.75 |
| **Youngstown, O., base** | 25.75 | 25.25 | 26.25 | 25.75 |
| Mansfield, O., del. | 27.69 | 27.19 | 28.19 | 27.69 |

Base grade, silicon 1.75-2.25%; add 50 cents for each additional 0.25% silicon, or portion thereof; deduct 50 cents for silicon below 1.75% on foundry iron. §For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaco, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenbridge 1.24

Note: Add 50 cents per ton for each 0.50% manganese or portion thereof over 1.00%.

Nickel differentials: Under 0.50%, no extra; 0.50% to 0.74% incl., $2 per tun; for each additional 0.25% nickel, $1 per ton.

**High Silicon, Silvery**

| | | | |
|---|---|---|---|
| 6.00-6.50 per cent (base) | $31.25 | | |
| 6.51-7.00 | $32.25 | 9.01- 9.50 | 37.25 |
| 7.01-7.50 | 33.25 | 9.51-10.00 | 38.25 |
| 7.51-8.00 | 34.25 | 10.01-10.50 | 39.25 |
| 8.01-8.50 | 35.25 | 10.51-11.00 | 40.25 |
| 8.51-9.00 | 36.25 | 11.01-11.50 | 41.25 |

F.o.b. Jackson county, O., per gross ton. Buffalo base $1.25 higher, whichever is most favorable to buyer. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

**Electric Furnace Ferrosilicon:** Sil. 14.01 to 14.50%, $45.50 Jackson Co.; each additional .50% silicon up to and including 18% add $1; low impurities not exceeding 0.005 Phos., 0.40 Sulphur, 1.0% Carbon, add $1.

**Bessemer Ferrosilicon**

Prices same as for high silicon silvery iron, plus $1 per gross ton.

**Charcoal Pig Iron**

**Northern**

Lake Superior Furn. ..... $34.00
Chicago, del. ..... 37.34

**Southern**

Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn. $33.00 (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

**Gray Forge**

Neville Island, Pa. ..... $25.25
Valley base ..... 25.25

**Low Phosphorus**

Basing points: Birdsboro, Pa., Steelton, Pa., and Buffalo, N. Y., $31.25 base; $32.49, del. Philadelphia. Intermediate phos., Central Furnace, Cleveland, $28.25.

**Switching Charges:** Basing Point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

**Silicon Differential:** Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

**Phosphorus Differential:** Basing point prices are subject to a reduction of 38 cents a ton for phosphorus content of 0.70% and over.

**Ceiling Prices** are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

**Exceptions to Ceiling Prices:** Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic, Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton.

## Refractories

Per 1000 f.o.b. Works, Net Prices

**Fire Clay Brick**

Super Duty

Pa., Mo., Ky. ..... $68.50

First Quality

Pa., Ill., Md., Mo., Ky. .... 54.40
Alabama, Georgia ..... 54.40
New Jersey ..... 59.35
Ohio ..... 47.70

Second Quality

Pa., Ill., Md., Mo., Ky. .... 49.35
Alabama, Georgia ..... 40.30
New Jersey ..... 52.00
Ohio ..... 38.15

**Malleable Bung Brick**

All bases ..... 63.45

**Silica Brick**

Pennsylvania ..... 54.40
Joliet, E. Chicago ..... 62.45
Birmingham, Ala. ..... 54.40

**Ladle Brick**

(Pa., O., W. Va., Mo.)

Dry Press ..... 32.90
Wire Cut ..... 30.80

**Magnesite**

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk ..... 22.00
net ton, bags ..... 26.00

**Basic Brick**

net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick ..... 54.00
Chem. bonded chrome ..... 54.00
Magnesite brick ..... 76.00
Chem. bonded Magnesite .... 65.00

## Fluorspar

Metallurgical grade, f.o.b. Ill., Ky., net tons, carloads, $CaF^2$ content, 70% or more, $33; 65 but less than 70%, $32; 60 but less than 65% $31; less than 60%, $30. After Aug. 29 base price any grade $30.00 war chemicals.

## Ferroalloy Prices

**Ferromanganese (standard)** 78-82% c.l. gross ton, duty paid, $135 f.o.b. cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer; Rockdale or Rockwood, Tenn.; where Tennessee Products Co. is producer; Birmingham, Ala., where Sloss-Sheffield Steel & Iron Co. is producer; $140 f.o.b. cars, Pittsburgh, where Carnegie-Illinois Steel Corp. is producer; add $6 for packed c.l., $10 for ton, $13.50 for less ton; $1.70 for each 1%, or fraction contained manganese over 82% or under 78%.

**Ferromanganese (Low and Medium Carbon);** per lb. contained manganese; eastern zone, low carbon, bulk, c.l., 23c; 2000 lb. to c.l., 23.40c; medium, 14.50c and 15.20c; central, low carbon, bulk, c.l., 23.30c; 2000 lb. to c.l., 24.40c; medium 14.80c and 16.20c; western, low carbon, bulk, c.l., 24.50c, 2000 lb. to c.l., 25.40c; medium, 15.75c and 17.20c; f.o.b. shipping point, freight allowed.

**Spiegeleisen:** 19-21% carlots per gross ton, Palmerton, Pa., $36; Pittsburgh, $40.50; Chicago, $40.60.

**Electrolytic Manganese:** 99.9% plus, less ton lots, per lb. 37.6 cents.

**Chromium Metal:** 97% min. chromium, max. .50% carbon, eastern zone, per lb. contained chromium bulk, c.l., 79.50c, 2000 lb. to c.l. 80c; central 81c and 82.50c; western 82.25c and 84.75c; f.o.b. shipping point, freight allowed.

**Ferrocolumbium:** 50-60%, per lb. contained columbium in gross ton lots, contract basis, R. R. freight allowed, eastern zone, $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

**Ferrochrome:** High carbon, eastern zone, bulk, c.l., 13c, 2000 lb. to c.l. 13.90c; central, add .40c and .65c; western, add 1c and 1.85c—high nitrogen, high carbon ferrochrome; Add 5c to all high carbon ferrochrome prices; all zones; low carbon eastern, bulk, c.l. max. 0.06% carbon, 23c, 0.10% 22.50c, 0.15% 22c, 0.20% 21.50c, 0.50% 21c, 1.00% 20.50c, 2.00% 19.50c; 2000 lb. to c.l., 0.06% 24c, 0.10% 23.50c, 0.15% 23c, 0.20% 22.50c, 0.50% 22c, 1.00% 21.50c, 2.00% 20.50c; central, add .4c for bulk, c.l. and .65 for 2000 lb. to c.l.; western, add 1c for bulk, c.l. and 1.85c for 2000 lb. c.l.; carload packed differential .45c; f.o.b. shipping point, freight allowed. Prices per lb. contained Cr high nitrogen, low carbon ferrochrome: Add 2c to low carbon ferrochrome prices; all zones. For higher nitrogen carbon add 2c for each .25% of nitrogen over 0.75%.

**Special Foundry ferrochrome:** (Chrom. 62-66%, car. approx. 5-7%) Contract, carload, bulk 13.50c, packed 13.95c, ton lots 14.40c, less, 14.90c, eastern, freight allowed, per pound contained chromium; 13.90c, 14.35c, 15.05c and 15.55c central; 14.50c, 14.95c, 16.25c and 16.75c, western; spot up .25c.

**S.M. Ferrochrome, high carbon:** (Chrom: 60-65%, sil. 4-6%, mang. 4-6% and carbon 4-6%.) Contract, carlot, bulk, 14.00c, packed 14.45c, ton lots 14.90c, less 15.40c, eastern, freight allowed; 14.40c, 14.85c, 15.55c and 16.05c, central; 15.00c, 15.45c, 16.75c and 17.25c, western; spot up .25c; per pound contained chromium.

**S.M. Ferrochrome, low carbon:** (Chrom. 62-66%, sil. 4-6%, mang. 4-6% and carbon 1.25% max.) Contract, carlot, bulk, 20.00c, packed 20.45c, ton lots 21.00c, less ton lots 22.00c, eastern, freight allowed, per pound contained chromium, 20.40c, 20.85c, 21.65c and 22.65c, central; 21.00c, 21.45c, 22.85c and 23.85c, western; spot up .25c.

**SMZ Alloy:** (Silicon 60-65%, Mang. 5-7%, zir. 5-7% and iron approx. 20%) per lb. of alloy contract carlots 11.50c, ton lots 12.00c, less 12.50c, eastern zone, freight allowed; 12.00c, 12.85c and 13.35c central zone; 14.05c, 14.60c and 15.10c, western; spot up .25c.

**Silcaz Alloy:** (Sil. 35-40%, cal. 9-11%, alum. 6-8%, zir. 3-5%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy contract, carlots 25.00c, ton lots 26.00c, less ton lots 27.00c, eastern, freight allowed, 25.50c, 26.75c and 27.75c, central; 27.50c, 28.90c and 29.90c, western; spot up .25c.

**Silvaz Alloy:** (Sil. 35-40%, van. 9-11%, alum. 5-7%, zir. 5-7%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy. Contract, carlots 58.00c, ton lots 59.00c, less 60.00c, eastern, freight allowed; 58.50c, 59.75c and 60.75c, central; 60.50c, 61.90c and 62.90c, western; spot up ¼c.

**CMSZ Alloy 4:** (Chr. 45-49%, mang. 4-6%, sil. 18-21%, zir. 1.25-1.75%, and car. 3.00-4.50%). Contract carlots, bulk, 11.00c and packed 11.50c; ton lots 12.00c; less 12.50c, eastern, freight allowed; 11.50c and 12.00c, 12.75c, 13.25c, central; 13.50c and 14.00c, 14.75c, 15.25c, western; spot up .25c.

**CMSZ Alloy 5:** (Chr. 50-56%, mang. 4-6%, sil. 13.50-16.00%, zir. .75-1.25%, car. 3.50-5.00%) per lb. of alloy. Contract, carlots, bulk, 10.75c, packed 11.25c, ton lots 11.75c, less 12.25c, eastern, freight allowed; 11.25c, 11.75c and 12.50c, central; 13.25c and 13.75c, 14.50c and 15.00c, western; spot up .25c.

**Ferro-Boron:** (Bor. 17.50% min., sil. 1.50% max., alum. 0.50% max. and car. 0.50% max.) per lb. of alloy contract ton lots, $1.20, less ton lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

**Manganese-Boron:** (Mang. 75% approx., boron 15-20%, iron 5% max. sil. 1.50% max. and carbon 3% max.), per lb. of alloy. Contract ton lots, $1.89, less $2.01, eastern; freight allowed; $1.903 and $2.023, central, $1.935 and $2.055 western; spot up 5c.

**Nickel-Boron:** (Bor. 15-18%, alum. 1% max., sil. 1.50% max., car. 0.50% max., iron 3% max., nickel, balance), per lb. of alloy. Contract, 5 tons or more, $1.90, 1 ton to 5 tons, $2.00, less than ton $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

**Chromium-Copper:** (Chrom. 8-11%, cu. 88-90%, iron 1% max. sil. 0.50% max.) contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot up 2c.

**Vanadium Oxide:** (Fused: Vanadium oxide 85-88%, sodium oxide approx. 10% and calcium oxide, approx. 2%, or Red Cake; Vanadium oxide 85% approx., sodium oxide, approx. 9% and water approx.

2.5%) Contract, any quantity, $1.10 eastern, freight allowed per pound vanadium oxide contained; contract carlots, $1.105, less carlots, $1.108, central; $1.118 and $1.133, western; spot add 5c to contracts in all cases.

**Calcium metal; cast:** Contract ton lots or more $1.35, less, $1.60, pound of metal; $1.36 and $1.61 central, $1.40 and $1.65, western; spot up 5c.

**Calcium-Manganese-Silicon:** (Cal. 16-20% mang. 14-18% and sil. 53-59%), per lb. of alloy. Contract, carlots, 15.50c, ton lots 16.50c and less 17.00c, eastern, freight allowed; 16.00c, 17.35c, and 17.85c, central; 18.05c, 19.10c and 19.60c western; spot up .25c.

**Calcium-Silicon:** (Cal. 30-35%, sil. 60-65% and iron 3.00% max.), per lb. of alloy. Contract, carlot, lump 18.00c, ton lots 14.50c, less 15.50c, eastern, freight allowed; 13.50c, 15.25c and 16.25c central; 15.55c, 17.40c and 18.40c, western; spot up .25c.

**Briquets, Ferromanganese:** (Weight approx. 3 lbs. and containing exactly 2 lbs. mang.) per lb. of briquets. Contract, carlots, bulk .0605c, packed .063c, tons .0655c, less .068c eastern freight allowed; .063c, .0655c, .0755c and .078c, central; .066c, .0685c, .0855c, and .088c, western; spot up .25c.

**Briquets: Ferrochrome,** containing exactly 2 lb. cr., eastern zone, bulk, c.l., 8.25c per lb. of briquets, 2000 lb. to c.l., 8.75c; central, add .3c for c.l. and .5c for 2000 lb. to c.l.; western, add .70c for c.l., and .2c for 2000 lb. to c.l.; **silicomanganese,** eastern, containing exactly 2 lb. manganese and approx. ½ lb. silicon, bulk, c.l., 5.80c, 2000 lbs. to c.l., 6.30c; central, add .25c for c.l. and 1c for 2000 lb. to c.l.; western, add .5c for c.l., and 2c for 2000 lb. to c.l.; **ferrosilicon,** eastern, approx. 5 lb., containing exactly 2 lb. silicon, or weighing approx. 2½ lb. and containing exactly 1 lb. of silicon, bulk, c.l., 3.35c, 2000 lb. to c.l., 3.80c; central, add 1.50c for c.l., and .40c for 2000 lb. to c.l.; western, add 3.0c for c.l. and .45c for 2000 to c.l.; f.o.b. shipping point, freight allowed.

**Ferromolybdenum:** 55-75% per lb. contained molybdenum f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

**Ferrophosphorus:** 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

**Ferrosilicon:** Eastern zone, 90-95%, bulk, c.l., 11.05c, 2000 lb. to c.l., 12.30c; 80-90%, bulk c.l., 8.90c, 2000 lb. to c.l., 9.95c; 75%, bulk, c.l., 8.05c, 2000 lb. to c.l., 9.05c; 50%, bulk c.l., 6.65c and 2000 lb. to c.l., 7.85c; central 90-95%, bulk, c.l., 11.20c, 2000 lb. to c.l., 12.80c; 80-90%, bulk, c.l., 9.05c, 2000 to c.l., 10.45c; 75%, bulk, c.l., 8.20c, 2000 lb. to c.l., 9.65c; 50% bulk, c.l., 7.10c, 2000 lb. to c.l., 9.70c; western, 90-95%, bulk, c.l., 11.65c, 2000 lb. to c.l., 15.60c; 80-90%, bulk, c.l., 9.55c, 2000 lb. to c.l., 13.50c; 75%, bulk, c.l., 8.75c, 2000 to c.l., 13.10c; 50%, bulk, c.l., 7.25c, 2000 to c.l., 8.75c; f.o.b. shipping point, freight allowed. Prices per lb. contained silicon.

**Grainal:** Vanadium Grainal No. 1 87.5c; No. 6, 60c; No. 79, 45c; all f.o.b. Bridgeville, Pa., usual freight allowance.

**Silicon Metal:** Min. 97% silicon and max. 1% iron, eastern zone, bulk, c.l., 12.90c; 2000 lb. to c.l., 13.45c; central, 13.20c and 13.90c; western, 13.85c and 16.80c; min. 96% silicon and max. 2% iron, eastern, bulk, c.l., 12.50c, 2000 lb. to c.l., 13.10c; central, 12.80c and 13.55c; western, 13.45c and 16.50c f.o.b. shipping point, freight allowed. Price per lb. contained silicon.

**Manganese Metal:** (96% min. manganese, max. 2% iron), per lb. of metal, eastern zone, bulk, c.l., 30c, 2000 lb. to c.l., 32c, central, 30.25c, and 33c; western 30.55c and 35.05c.

**Ferrotungsten:** Spot, 10,000 lb. or more, per lb. contained tungsten, $1.90; contract, $1.88; freight allowed as far west as St. Louis.

**Tungsten Metal Powder:** Spot, not less than 97 per cent, $2.50-$2.60; freight allowed as far west as St. Louis.

**Ferrotitanium:** 40-45%, R.R. freight allowed, per lb. contained titanium; ton lots $1.23; less-ton lots $1.25; eastern. Spot up 5 cents per lb.

**Ferrotitanium:** 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40 eastern. Spot 5 cents per lb. higher.

**High-Carbon Ferrotitanium:** 15-20% contract basis, per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destination east of Mississippi River and North of Baltimore and St. Louis, 6.8% carbon $142.50; 3-5% carbon $157.50.

**Carbortam:** Boron 0.90 to 1.15% net ton to carload, 8c lb. f.o.b. Suspension Bridge, N. Y., frt. allowed same as high-carbon ferrotitanium.

**Bortam:** Boron 1.5-1.9%, ton lots 45c lb., less ton lots 50c lb.

**Ferrovanadium:** 35-55%, contract basis, per lb. contained vanadium, f.o.b. producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

**Zirconium Alloys:** 12-15%, per lb. of alloy, eastern contract, carlots, bulk, 4.60c, packed 4.80c, ton lots 4.80c, less tons 5c, carloads, bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot ¼c per ton higher.

**Zirconium Alloy:** 35-40%, Eastern, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼ cent higher.

**Alsifer:** (Approx. 20% aluminum, 40% silicon, 40% iron) contract basis f.o.b. Niagara Falls, N. Y., per lb. 5.75c; ton lots 6.50c. Spot ½ cent higher.

**Siminal:** (Approx. 20% each si., Mn., Al.) Contract, frt. all. not over St. Louis rate, per lb. alloy; carlots 8c; ton lots 8.75c; less ton lots 9.25c.

**Borosil:** 3 to 4% boron, 40 to 45% Si., $6.25 lb. cont. Bo., f.o.b. Philo, O., freight not exceeding St. Louis rate allowed.

# OPEN MARKET PRICES, IRON AND STEEL SCRAP

Following prices are quotations developed by editors of STEEL in the various centers. For complete OPA ceiling price schedule refer to page 156 of Sept. 4, 1944, issue of STEEL. Quotations are on gross tons.

**PHILADELPHIA:**

(Delivered consumer's plant)

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $18.75 |
| No. 2 Heavy Melt. Steel | 18.75 |
| No. 2 Bundles | 18.75 |
| No. 3 Bundles | 16.75 |
| Mixed Borings, Turnings | 13.75 |
| Machine Shop Turnings | 13.75 |
| Billet, Forge Crops | 23.75 |
| Bar Crops, Plate Scrap | 21.25 |
| Cast Steel | 21.25 |
| Punchings | 21.25 |
| Elec. Furnace Bundles | 19.75 |
| Heavy Turnings | 18.25 |

**Cast Grades**

(F.o.b. Shipping Point)

| | |
|---|---|
| Heavy Breakable Cast | 16.50 |
| Charging Box Cast | 19.00 |
| Cupola Cast | 20.00 |
| Unstripped Motor Blocks | 17.50 |
| Malleable | 22.00 |
| Chemical Borings | 16.51 |

**NEW YORK:**

(Dealers' buying prices)

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $15.33 |
| No. 2 Heavy Melt. Steel | 15.33 |
| No. 2 Hyd. Bundles | 15.33 |
| No. 3 Hyd. Bundles | 13.33 |
| Chemical Borings | 14.33 |
| Machine Turnings | 10.33 |
| Mixed Borings, Turnings | 10.33 |
| No. 1 Cupola | 20.00 |
| Charging Box | 19.00 |
| Heavy Breakable | 16.50 |
| Unstrip Motor Blocks | 17.50 |
| Stove Plate | 19.00 |

**CLEVELAND:**

(Delivered consumer's plant)

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $19.50 |
| No. 2 Heavy Melt. Steel | 19.50 |
| No. 1 Comp. Bundles | 19.50 |
| No. 2 Comp. Bundles | 19.50 |
| No. 1 Busheling | 19.50 |
| Mach. Shop Turnings | 14.50 |
| Short Shovel Turnings | 16.50 |
| Mixed Borings, Turnings | 14.50 |
| No. 1 Cupola Cast | 20.00 |
| Heavy Breakable Cast | 16.50 |
| Cast Iron Borings | 13.50-14.00 |
| Billet, Bloom Crops | 24.50 |
| Sheet Bar Crops | 22.00 |
| Plate Scrap, Punchings | 22.00 |
| Elec. Furnace Bundles | 20.50 |

**BOSTON:**

(F.o.b. shipping points)

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $14.06 |
| No. 2 Heavy Melt. Steel | 14.06 |
| No. 1 Bundles | 14.06 |
| No. 2 Bundles | 14.06 |
| No. 1 Busheling | 14.06 |
| Machine Shop Turnings | 9.06 |
| Mixed Borings, Turnings | 9.06 |
| Short Shovel Turnings | 11.06 |
| Chemical Borings | 13.31 |
| Low Phos. Clippings | 16.56 |
| No. 1 Cast | 20.00 |
| Clean Auto Cast | 20.00 |
| Stove Plate | 19.00 |
| Heavy Breakable Cast | 16.50 |

Boston Differential 99 cents higher, steel-making grades; Providence $1.09 higher.

**PITTSBURGH:**

(Delivered consumer's plant)

| | |
|---|---|
| Railroad Heavy Melting | $21.00 |
| No. 1 Heavy Melt. Steel | 20.00 |
| No. 2 Heavy Melt. Steel | 20.00 |
| No. 1 Comp. Bundles | 20.00 |
| No. 2 Comp. Bundles | 20.00 |
| Short Shovel Turnings | 17.00 |
| Mach. Shop Turnings | 15.00 |
| Mixed Borings, Turnings | 15.00 |
| No. 1 Cupola Cast | 20.00 |
| Heavy Breakable Cast | 16.50 |
| Cast Iron Borings | 16.00 |
| Billet, Bloom Crops | 25.00 |
| Sheet Bar Crops | 22.50 |
| Plate Scrap, Punchings | 22.50 |
| Railroad Specialties | 24.50 |
| Scrap Rail | 21.50 |
| Axles | 26.00 |
| Rail 3 ft. and under | 23.50 |
| Railroad Malleable | 22.00 |

**VALLEY:**

(Delivered consumer's plant)

| | |
|---|---|
| No. 1 R.R. Heavy Melt. | $21.00 |
| No. 1 Heavy Melt. Steel | 20.00 |
| No. 1 Comp. Bundles | 20.00 |
| Short Shovel Turnings | 17.00 |
| Cast Iron Borings | 16.00 |
| Machine Shop Turnings | 15.00 |
| Low Phos. Plate | 22.50 |

**MANSFIELD, O:**

(Delivered consumer's plant)

| | |
|---|---|
| Machine Shop Turnings | $15.00 |

**BIRMINGHAM:**

(Delivered consumer's plant)

| | |
|---|---|
| Billet Forge Crops | $22.00 |
| Structural, Plate Scrap. | 19.00 |
| Scrap Rails Random | 18.50 |
| Rerolling Rails | 20.50 |
| Angle Splice Bars | 20.50 |
| Solid Steel Axles | 24.00 |
| Cupola Cast | 20.00 |
| Stove Plate | 19.00 |
| Long Turnings | 8.50- 9.00 |
| Cast Iron Borings | 8.50- 9.00 |
| Iron Car Wheels | 16.50-17.00 |

**CHICAGO:**

(Delivered consumer's plant)

| | |
|---|---|
| No. 1 R.R. Heavy Melt. | $19.75 |
| No. 1 Heavy Melt. Steel | 18.75 |
| No. 2 Heavy Melt. Steel | 18.75 |
| No. 1 Ind. Bundles | 18.75 |
| No. 2 Dir. Bundles | 18.75 |
| Baled Mach. Shop Turn. | 18.75 |
| No. 3 Galv. Bundles | 16.75 |
| Machine Turnings | 13.75 |
| Mix. Borings, Sht. Turn. | 13.75 |
| Short Shovel Turnings | 15.75 |
| Cast Iron Borings | 14.75 |
| Scrap Rails | 20.25 |
| Cut Rails, 3 feet | 22.25 |
| Cut Rails, 18-inch | 23.50 |
| Angles, Splice Bars | 22.25 |
| Plate Scrap, Punchings | 21.25 |
| Railroad Specialties | 22.75 |
| No. 1 Cast | 20.00 |
| R.R. Malleable | 22.00 |

(Cast grades f.o.b. shipping point, railroad grades f.o.b. tracks)

**BUFFALO:**

(Delivered consumer's plant)

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $19.25 |
| No. 2 Heavy Melt. Steel | 19.25 |
| No. 1 Bundles | 19.25 |
| No. 2 Bundles | 19.25 |
| No. 1 Busheling | 19.25 |
| Machine Turnings | 14.25 |
| Short Shovel Turnings | 16.25 |
| Mixed Borings, Turn. | 14.25 |
| Cast Iron Borings | 15.25 |
| Low Phos. | 21.75 |

**DETROIT:**

(Delivered consumer's plant)

| | |
|---|---|
| Heavy Melting Steel | $17.32 |
| No. 1 Busheling | 17.32 |
| Hydraulic Bundles | 17.32 |
| Flashings | 17.32 |
| Machine Turnings | 12.32 |
| Short Shovel, Turnings | 14.32 |
| Cast Iron Borings | 13.32 |
| Low Phos. Plate | 19.82 |
| No. 1 Cast | 20.00 |
| Heavy Breakable Cast | 16.50 |

**ST. LOUIS:**

(Delivered consumer's plant)

| | |
|---|---|
| Heavy Melting | 17.50 |
| No. 1 Locomotive Tires | 20.00 |
| Misc. Rails | 19.00 |
| Railroad Springs | 22.00 |
| Bundled Sheets | 17.50 |
| Axle Turnings | 17.00 |
| Machine Turnings | 10.50 |
| Shoveling Turnings | 12.50 |
| Rerolling Rails | 21.00 |
| Steel Car Axles | 21.50-22.00 |
| Steel Rails, 3 ft. | 21.50 |
| Steel Angle Bars | 21.00 |
| Cast Iron Wheels | 20.00 |
| No. 1 Machinery Cast | 20.00 |
| Railroad Malleable | 22.00 |
| Breakable Cast | 16.50 |
| Stove Plate | 19.00 |
| Grate Bars | 15.25 |
| Brake Shoes | 15.25 |

(Cast grades f.o.b. shipping point)

| | |
|---|---|
| Stove Plate | 18.00 |

**CINCINNATI:**

(Delivered consumer's plant)

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $18.50 |
| No. 2 Heavy Melt. Steel | 18.50 |
| No. 1 Comp. Bundles | 18.50 |
| No. 2 Comp. Bundles | 18.50 |
| Machine Turnings | 9.50-10.00 |
| Shoveling Turnings | 11.50-12.00 |
| Cast Iron Borings | 11.00-11.50 |
| Mixed Borings, Turnings | 10.50-11.00 |
| No. 1 Cupola Cast | 20.00 |
| Breakable Cast | 16.50 |
| Low Phosphorus | 21.00-21.50 |
| Scrap Rails | 20.50-21.00 |
| Stove Plate | 16.00-16.50 |

**LOS ANGELES:**

(Delivered consumer's plant)

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $14.00 |
| No. 2 Heavy Melt. Steel | 13.00 |
| No. 1, 2 Deal. Bundles | 12.00 |
| Machine Turnings | 4.50 |
| Mixed Borings, Turnings | 4.00 |
| No. 1 Cast | 20.00 |

**SAN FRANCISCO:**

(Delivered consumer's plant)

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $15.50 |
| No. 2 Heavy Melt. Steel | 14.50 |
| No. 1 Busheling | 15.50 |
| No. 1, No. 2 Bundles | 13.50 |
| No. 3 Bundles | 9.00 |
| Machine Turnings | 7.00 |
| Billet, Forge Crops | 15.50 |
| Bar Crops, Plate | 15.50 |
| Cast Steel | 15.50 |
| Cut, Structural, Plate, 1", under | 18.00 |
| Alloy-free Turnings | 7.00 |
| Tin Can Bundles | 14.50 |
| No. 2 Steel Wheels | 15.50 |
| Iron, Steel Axles | 23.00 |
| No. 2 Cast Steel | 15.50 |
| Uncut Frogs, Switches | 15.50 |
| Scrap Rails | 15.50 |
| Locomotive Tires | 15.50 |

**Copper:** Electrolytic or Lake from producers in carlots 12.00c, Del. Conn., less carlots 12.12½c, refinery; dealers may add ¼c for 5000 lbs. to carload; 1000-4999 lbs. 1c; 500-999 1¼c; 0-499 2c. Casting, 11.75c, refinery for 20,000 lbs., or more. 12.00c less than 20,000 lbs.

**Brass Ingot:** Carlot prices, including 25 cents per hundred freight allownace; add ¼c for less than 20 tons; 85-5-5-5 (No. 115) 13.00c; 88-10-2 (No. 215) 16.50c; 80-10-10 (No. 305) 15.75c; Navy G (No. 225) 16.75c; Navy M (No. 245) 14.75c; No. 1 yellow (No. 405) 10.00c; manganese bronze (No. 420) 12.75c.

**Zinc:** Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, E. St. Louis, for lariots. For 20,000 lbs. to carlots add 0.15c; 10,000-20,000 0.25c; 2000-10,000 0.40c; under 2000 0.50c.

**Lead:** Common 6.35c, chemical, 6.45c, corroding, 6.45, E. St. Louis for carloads; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland-Akron-Detroit area, New Jersey, New York state, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester, Springfield, New Hampshire, Rhode Island.

**Primary Aluminum:** 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lbs. and over; add ½c 2000-9999 lbs.; 1c less through 2000 lbs.

**Secondary Aluminum:** All grades 12.50c per lb. except as follows: Low grade piston alloy (No. 122 type) 10.50c; No. 12 foundry alloy (No. 2 grade) 10.50c; chemical warfare service ingot (92½% plus) 10.00c; steel deoxidizers in notch bars, granulated or shot, Grade 1 (95-97½%) 11.00c, Grade 2 (92-95%) 9.50c to 9.75c, Grade 3 (90-92%) 8.00c to 8.25c, Grade 4 (85-90%) 7.75c; any other ingot containing over 1% iron, except PM 754 and hardeners, 12.00c. Above prices for 30,000 lb. or more; add ¼c 10,000-30,000 lb.; ½c 1000-10,000 lbs.; 1c less than 1000 lbs. Prices include freight at carload rate up to 75 cents per hundred.

**Magnesium:** Commercially pure (99.8%) standard ingots (4-notch, 17 lbs.) 2.50c lb., add 1c for special shapes and sizes. Alloy ingots, incendiary bomb alloy, 23.40c; 50-50 magnesium-aluminum, 23.75c; ASTM B93-41T, Nos. 2, 3, 4, 12, 13, 14, 17, 23.00c; Nos. 4X, 11, 13X, 17X, 25.00c; ASTM B-107-41T, or B-90-41T, No. 8X, 23.00c; No. 18, 23.50c; No. 18X, 28.00c. Selected magnesium crystals, crowns, and muffs, including all packing screening, barrelling, handling, and other preparation charges, 23.50c. Price for 100 lbs. or more; for 25-100 lbs., add 10c; for less than 25 lbs., 20c. Incendiary bomb alloy, f.o.b. plant, any quantity; carload freight allowed all other alloys for 500 lbs. or more.

**Tin:** Prices ex-dock, New York in 5-ton lots, Add 1 cent for 2240-11,199 lbs., 1½c 1000-2239. 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05 per cent maximum arsenic, 51.87½c; Grade C, 99.65-99.79% incl. 51.62½c; Grade D, 99.50-99.64% incl., 51.50c; Grade E, 99-99.49% incl. 51.12½c; Grade F, below 99% (for tin content), 51.00c.

**Antimony:** American bulk carlots f.o.b. Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 14.50c; 99.8% and over (arsenic, 0.05%, max. and other impurities, 0.1%, max.) 15.00c. On producers' sales add ¼c for less than carload to 10,000 lb.; ½c for 9999-224 lb.; and 2c for 223 lb. and less; on sales by dealers, distributors and jobbers add ½c, 1c, and 3c, respectively.

**Nickel:** Electrolytic cathodes, 99.5%, f.o.b. refinery 35.00c lb.; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c; Monel shot 28.00c.

**Mercury:** Open market, spot, New York, $103-$106 per 76-lb. flask.

**Arsenic:** Prime, white, 99%, carlots, 4.00c lb.

**Beryllium-Copper:** 3.75-4.25% Be., $17 lb. contained Be.

**Cadmium:** Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms 90.00c lb., del.; anodes, balls, discs and all other special or patented shapes 95.00c lb. del.

**Cobalt:** 97-99%, $1.50 lb., for 550 lb. (bbl.); $1.52 lb. for 100 lb. (case); $1.57 lb. under 100 lb.

**Indium:** 99.9%, $7.50 per troy ounce.

**Gold:** U. S. Treasury, $35 per ounce.

**Silver:** Open market, N. Y. 70.625c per ounce.

**Platinum:** $35 per ounce.

**Iridium:** $165 per troy ounce.

**Palladium:** $24 per troy ounce.

## Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 12.00c, Conn., for Copper. Freight prepaid on 100 lbs. or more.

**Sheet:** Copper 20.87c; yellow brass 19.48c; commercial bronze, 90% 21.07c, 95% 21.28c; red brass 80% 20.15c, 85% 20.36c; phosphor bronze, Grades A and B 5% 36.25c; Everdur, Herculoy, Duronze or equiv. 26.00c; naval brass 24.50c; manganese bronze 28.00c; Muntz metal 22.75c; nickel silver 5% 26.50c.

**Rods:** Copper, hot-rolled 17.37c, cold-rolled 18.37c; yellow brass 15.01c; commercial bronze 90% 21.32c, 95% 21.53c; red brass 80% 20.48c, 85% 20.61c; phosphor bronze Grade A, B 5% 36.50c; Everdur, Herculoy, Duronze or equiv. 25.50c; Naval brass 19.12c; manganese bronze 22.50c; Muntz metal 18.87c; nickel silver 5% 26.50c.

**Seamless Tubing:** Copper 21.37c; yellow brass 22.23c; commercial bronze 90% 23.47c; red brass 80% 22.80c, 85% 23.01c.

**Extruded Shapes:** Copper 20.87c; architectural bronze 19.12c; manganese bronze 24.00c; Muntz metal 20.12c; Naval brass 20.37c.

**Angles and Channels:** Yellow brass 27.98c; commercial bronze 90% 29.75c, 95% 29.78c; red brass 80% 28.65c, 85% 28.86c.

**Copper Wire:** Soft, f.o.b. Eastern mills, carlots 15.37½c, less-carlots 15.87½c; weatherproof, f.o.b. Eastern mills, carlot 17.00c, less-carlots 17.50c; magnet, delivered carlots 17.50c, 15,000 lbs. or more 17.75c, less carlots 18.25c.

**Aluminum Sheets and Circles:** 2s and 3s flat mill finish, base 30,000 lbs. or more; del.; sheet widths as indicated; circle diameter 9" and larger:

| Gage | Width | Sheets | Circles |
|---|---|---|---|
| .249"-7 | 12"-48" | 22.70c | 25.20c |
| 8-10 | 12"-48" | 23.20c | 25.70c |
| 11-12 | 26"-48" | 24.20c | 27.00c |
| 13-14 | 26"-48" | 25.20c | 28.50c |
| 15-16 | 26"-48" | 26.40c | 30.40c |
| 17-18 | 26"-48" | 27.90c | 32.90c |
| 19-20 | 24"-42" | 29.80c | 35.30c |
| 21-22 | 24"-42" | 31.70c | 37.20c |
| 23-24 | 3"-24" | 25.60c | 29.20c |

**Lead Products:** Prices to jobbers; full sheets 9.50c; cut sheets 9.75c; pipe 8.15c, New York; 8.25c, Philadelphia, Baltimore, Rochester and Buffalo; 8.75c, Chicago, Cleveland, Worcester, Boston.

**Zinc Products:** Sheet f.o.b. mill, 13.15c; 36,000 lbs. and over deduct 7%; Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2%, 9000 lbs. 3%, 18,000 lbs. 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

## Plating Materials

**Chromic Acid:** 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs. to 1 ton 17.75c; under 400 lbs. 18.25c.

**Copper Anodes:** Base 2000-5000 lbs., del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

**Copper Carbonate:** 52-54% metallic cu, 250 lb. barrels 20.50c.

**Copper Cyanide:** 70-71% cu, 100-lb. kegs or bbls. 34.00c f.o.b. Niagara Falls.

**Sodium Cianide:** 96%, 200-lb. drums 15.00c; 10,000-lb. lots 13.00c f.o.b. Niagara Falls.

**Nickel Anodes:** 500-2999 lb. lots; cast and rolled carbonized 47.00c; rolled depolarized 48.00c.

**Nickel Chloride:** 100-lb. kegs or 275-lb. bbls. 18.00c lb., del.

**Tin Anodes:** 1000 lbs. and over 58.50c del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c. **Tin Crystals:** 400 lb. bbls. 39.00c f.o.b. Grasselli, N. J.; 100-lb. kegs 39.50c.

**Sodium Stannate:** 100 or 300-lb. drums 36.50c, del.; ton lots 35.50c.

**Zinc Cyanide:** 100-lb. kegs or bbls. 33.00c f.o.b. Niagara Falls.

**Brass Mill Allowances:** Prices for less than 15,000 lbs. f.o.b. shipping point. Add ⅝c for 15,000-40,000 lbs.; 1c for 40,000 or more.

## Scrap Metals

| | Clean Heavy | Rod Ends | Clean Turnings |
|---|---|---|---|
| Copper | 10.250 | 10.250 | 9.500 |
| Tinned Copper | 9.625 | 9.625 | 9.375 |
| Yellow Brass | 8.625 | 8.375 | 7.785 |
| Commercial bronze | | | |
| 90% | 9.375 | 9.125 | 8.625 |
| 95% | 9.500 | 9.250 | 8.750 |
| Red Brass, 85% | 9.125 | 8.875 | 8.375 |
| Red Brass, 80% | 9.125 | 8.875 | 8.375 |
| Muntz Metal | 8.000 | 7.750 | 7.250 |
| Nickel Sil, 5% | 9.250 | 9.000 | 4.625 |
| Phos. br., A, B, 5% | 11.000 | 10.750 | 9.750 |
| Herculoy, Everdur or equivalent | 10.250 | 10.000 | 9.250 |
| Naval brass | 8.250 | 8.000 | 7.500 |
| Mang. bronze | 8.250 | 8.000 | 7.500 |

**Other than Brass Mill Scrap:** Prices apply on material not meeting brass mill specifications and are f.o.b. shipping point; add ⅝c for shipment of 60,000 lbs. of one group and ½c for 20,000 lbs. of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 9.75c; No. 2 copper wire and mixed heavy copper, copper tuyeres 8.75c.

(Group 2) soft red brass and borings, aluminum bronze 9.00c; copper-nickel and borings 9.25c; car boxes, cocks and faucets 7.75c; bell metal 15.50c; babbit-lined brass bushings 13.00c.

(Group 3) zincy bronze borings, Admiralty condenser tubes, brass pipe 7.50c; Muntz metal condenser tubes 7.00c; yellow brass 6.25c; manganese bronze (lead 0.00%-0.40%) 7.25c, (lead 0.41%-1.0%) 6.25c; manganese bronze borings (lead 0.00-0.40%) 6.50c, (lead 0.41-1.00%) 5.50c.

**Aluminum Scrap:** Price f.o.b. point of shipment, truckloads of 5000 pounds or over; Segregated solids, 2S, 3S, 5c lb., 11, 14, etc., 3 to 3.50c lb. All other high grade alloys 5c lb. Segregated borings and turnings, wrought alloys, 2, 2.50c lb. Other high-grade alloys 3.50, 4.00c lb. Mixed plant scrap, all solids, 2, 2.50c lb. borings and turnings one cent less than segregated.

**Lead Scrap:** Prices f.o.b. point of shipment. For soft and hard lead, including cable lead, deduct 0.55c from basing point prices for refined metal.

**Zinc Scrap:** New clippings 7.25c, old zinc 5.25c f.o.b. point of shipment; add ½-cent for 10,000 lbs. or more. New die-cast scrap, radiator grilles 4.95c, add ½c 20,000 or more. Unsweated zinc dross; die cast slab 5.80c any quantity.

**Nickel, Monel Scrap:** Prices f.o.b. point of shipment; add ½c for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20,000 lbs. or more of Monel. Converters (dealers) allowed 2c premium.

**Nickel:** 98% or more nickel and not over ½% copper 26.00c; 90-98% nickel, 26.00c per lb. nickel contained.

**Cupro-nickel:** 90% or more combined nickel and copper 26.00c per lb. contained nickel, plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

**Monel:** No. 1 castings, turnings 15.00c; new clipping 20.00c; soldered sheet 18.00c.

## Sheets, Strip . . .

Sheet & Strip Prices, Page 152

Sheet production is increasing as mills get under way more fully but output still is far from sufficient to meet pending needs of consumers. Recent price advances by OPA have made possible adjustments and may cause some changes in specifications in electrical sheets. Nonintegrated sheet mills dependent on others for raw material are expected to be in easier position as a result of lower increases on sheet bar and higher on their finished product.

**Pittsburgh**—Price advances in sheets and strip, effective Feb. 15, range from $4.50 to $12 per net ton. Full implications of the new prices are now being studied. Some dissatisfaction is expressed over the $7 per ton increase for hot-rolled strip, 6-inches wide and under, in face of only $5 per ton advance for cold-rolled strip. Along with higher wage costs the cold-rollers apparently face a narrowing in their spread between purchased steel and selling prices. Fact that a number of hot-rolled strip producers have been out of production because previous price levels were unprofitable may account for the larger boost in hot-strip prices. The greater spread between semifinished steel prices and finished sheets is expected to aid nonintegrated mills. This is particularly the case in sheet bars which were advanced $2 a ton in contrast with the $3 for other semifinished items. However, the critical supply situation in sheet bars still remains to be solved. Unconfirmed rumors indicate that production of this product may be subsidized, but under present war powers legislation this plan could be undertaken only through June 30 and it is doubted that RFC would pick up the subsidy program at that time. OPA is said to have approved extras for selected rimmed stock for hot and cold-rolled carbon sheets and strip. The extras are those presently in effect for aluminum-killed steel; however, in no instance may the producer charge more than one of the following quality extras: Those applicable to aluminum-killed steel; those applicable to deep-drawing quality; or those applicable when drawing, quality, or physical test properties or values are specified or required, beyond commercial bend test, by the producer. Considerable interest is shown in the $12 per ton increase in three grades of electrical sheets, in contrast with $4.50 in black sheets and $7 a ton for galvanized and enameling sheets. There is speculation as to the probable effects of the rises in electrical sheets and enameling sheets upon the two big electrical manufacturing companies, now out on strike. It is pointed out that steel operations may soon be adversely affected because depleted stocks of electrical equipment make it impossible to remedy breakdowns quickly. Sheet and strip production is gradually edging upward but it will be at least two to three weeks before prestrike volume can be reached. Sellers are booked through remainder of this year on most items, with galvanized and electrical sheets further extended.

**Boston** — Spread in the advance of electrical sheet grades of $7.50 and $12 is expected to result in some revisions of buying specifications involving bor-

derline requirements. Inquiry for silicon grades is heavy, with little tonnage available before fourth quarter, schedules for which are yet to be made up. Stainless sheets, including unpolished, are tightening and some mills are giving no definite delivery promises on either sheets or strip at this time. Producers of electro-coated stock also are sold through the remainder of the year. Pressure for sheets is strong, including that from jobbers, and more surplus is being taken up by fabricators. In some instances surplus tonnage is being allocated. The advance in sheet prices is expected to be in base prices only, with few changes in extras. Cold-rolled strip producers are squeezed harder by the advance in hot strip prices, $7 for 6-inch and narrower, against $5 for cold-rolled in these widths. One nonintegrated converter estimates material and labor costs have gone up 14 per cent, compared with roughly 4 per cent increase in selling prices. Looming also is more competition with slit cold-rolled sheets in coils on a price basis.

Cleveland—Flat-rolled steel interests were still awaiting clarification of many pricing details last week, following issuance of amendment 15 to revised price schedule 6, providing for increase in base prices. It appeared probable that extras on sheet and strip, for instance, would be revised in the near future. Modification of maximum prices has not curtailed demand, although many fabricators are still out of the market pending a determination of price levels for their products on the basis of higher raw materials and labor costs. Several producers are turning back a large volume of new orders, especially on light-gage material since books are filled through 1946 and in some instances on light narrow strip through first quarter of next year.

Production changes will follow the price revisions. For instance, change in the method of quoting hot-rolled strip from a basis of 12 inches wide and less to the basis of 6 inches and narrower and wider than 6 inches is expected to result in an increase in demand for the wider strip. This will permit producers to turn out a larger tonnage and at the same time will provide consumers a $2 a ton saving in purchase cost if they can use the wider material. It is not clear yet whether the $7.50 to $12 a ton increase in electrical sheets will improve the relative position of that material so that a larger proportion of semifinished steel will be channeled into that product. Producers have not been accepting any additional orders for electrical sheets for 1946 delivery.

New York — Advance of $4.50 a ton, as recently announced by the Office of Price Administration, and retroactive as of Feb. 15, has brought the market here on hot-rolled sheets up to 2.665c per pound, delivered, and on cold-rolled sheets, up to 3.615c. Galvanized sheets, with an advance of $7 a ton, is quotable here at 4.29c, delivered. The increase in galvanized was more or less in line with trade expectations, as it was believed that an extra amount, as compared with what might be named for hot and cold-rolled sheets, would be announced because of the particular shortage in coated sheets. However, even appreciating the shortage in electrical sheets, in the electric, armature and field grades, the trade did not look for the

$12 increase which was named.

**Cincinnati**—District sheet mills are engaged in adjusting second quarter rolling schedules, a task which is made more difficult by the number of fabricators still affected by strikes who may, or may not, be taking deliveries in April. Commitments indicate little tonnage available the rest of the year, although bookings are being taken definitely only from quarter to quarter. One district mill is still down, pending study of new prices and wage demands.

**St. Louis** — Sheet and plate production has been resumed by Granite City Steel Co., which signed with United Steel Workers last Thursday. Capacity production is not expected for two weeks. Sheet schedules are filled to the second quarter of 1947 and virtually no new business has been accepted for several months. Books will stay closed until mills can appraise their position. Sheet producers regard the $5 price increase as totally inadequate, especially since they turn out few or none of the products given greater increases. They maintain a gain in man-hour productivity is their only chance of meeting the higher wage scales. The manpower situation now is about adequate, with quality improving somewhat.

**Chicago** — Although steel ingot production has been restored to within 14 points of prestrike, output of sheets has not kept pace. Sheet rolling has been stepped up as rapidly as possible, but condition of equipment after the month-long shutdown has required more readying than anticipated. Due to the time interval between ingot and finished sheets, shipments are just now being resumed in anything like volume. Users are pressing for deliveries in order to restore their own plant operations. New buying also is heavy, but some mills are so far behind as result of the strike and a heavy carryover tonnage, that they are declining new business.

**Philadelphia** — Sheet sellers are having to whittle down their second quarter quotas considerably, with some likely to enter the new period with a carryover of as much as 60 to 70 per cent. Under the circumstances it is not surprising that leading sellers regard themselves as fully covered for the remainder of the year on hot, cold and galvanized sheets and on such specialties as enameling stock, electrical sheets and polished stainless sheets. However, extra premiums allowed under the new OPA schedules, notably on some grades of electrical sheets of as much as $12 per ton, may stimulate production in certain specialties and thus ease their present schedules. One district hot sheet seller, who for some time had been quoting a $3 premium and recently, just prior to the general $4.50 advance, had been granted a $5 increase now is quoting 2.60c, Sparrows Point base, against the new general level at that base of 2.425c. Advances of 8.2 per cent, equivalent to the general overall increase for the basic steel industry as recently announced by OPA, are being announced by stainless sheet producers, the actual ceiling on stainless having been lifted by Washington last fall.

## Steel Bars . . .

Bar Prices, Page 152

Bar mills have covered carbon bar production for the remainder of the year in most instances, alloy bars being the only exception. Small sizes are most in demand and in alloys may be bought for September, with larger diameters in June. Many mills refuse to accept further business, not desiring to sell into 1947.

**Cleveland**—Bar sellers are refusing to accept a large number of carbon bar orders, due to their oversold position. Eight and ten-inch mills are booked through 1946 and into 1947 and larger mills are booked in some instances into the fourth quarter of this year. The alloy bar situation, however, is much easier with some openings still available in June on smaller sizes and to September on larger sizes. With demand as heavy as it is at present, the recent advance in prices will not cause any reduction on bookings or rolling schedules.

**Boston** — Hot-rolled alloy bars for April delivery are the only grades approximating normal supply. Carbon bars are sold virtually through the remainder of the year, notably in small sizes, although schedule revisions may make for some openings in fourth quarter. In alloys, deliveries on cold-drawn, turned, polished and ground are also extended beyond the normal spread with hot-rolled. In some sizes and grades cold-drawn carbon bars are available in late second quarter, but as current stock for drawing is declining further extensions in these may

be expected. Some producers are not taking orders on inquiries beyond this year. Consumer inventories are irregular, but generally low and somewhat out of balance.

**Philadelphia**—Certain larger bar consumers are either still down as a result of strikes or are operating at a low rate. However, demand is again picking up, with deliveries well extended. Few, if any, hot carbon bar producers have small rounds available before next year and not much of any size or specification before fourth quarter. One large producer still can quote August on flats 3½-inch and over, but this is an exception. Hot alloy bars can be had in April and May. The recent advance of $5 per ton places the delivered market here on hot carbon bars at 2.82c.

**Pittsburgh** — Hot-rolled merchant bars and bar size shapes under 3 inches, all types and grades, have been advanced 25 cents per 100 pounds to a $2.50 base, effective Feb. 15. Cold-finished carbon bars were advanced 35 cents per 100 pounds, thereby increasing the spread between regular carbon and cold-finished items to permit cold rollers sufficient margin to meet recent wage increase demands. Hot-rolled alloy bars and cold finished alloy bars are expected to be advanced 4 per cent. However, there is some discussion whether the 4 per cent increase is applicable to the base price or base price plus extras.

Sellers still are unable to give a clear idea of future delivery schedules except to state shipments generally are extended through the remainder of this year on small sizes. However, third-quarter deliveries are available on large rounds and alloys are available the latter part of second quarter. Cold drawers have order backlogs extending well into third quarter.

**New York** — Hot carbon bar consumers find little encouragement in the present situation. Most leading sellers are virtually out of the market for the entire year on small sizes and some are out for the year on all sizes. However, large flats and certain other heavier specifications can be picked up for shipment as early as August and some tonnage in medium sizes can be had for at least early fourth quarter delivery.

**St. Louis** — Merchant bars continue in heavy demand, especially smaller sizes. Schedules are filled for six months or more. Production is improving somewhat but most inquiries are rejected. Plant expansions are expected to increase output by midsummer.

## Steel Plates . . .

Plate Prices, Page 153

Shipbuilding requirements are increasing in the East, for new construction and repair work. A contract for trawlers for France has resulted in placing of 10,000 tons of steel, mainly plates, with two steelmakers. As a result of the steel strike inventories of fabricators have become unbalanced and mill shipments to restore balance are slow. Most producers are quoting fourth quarter, with an occasional lot available in third quarter.

**New York** — Plate demand is being stimulated by an increase in shipyard requirements, both for repairs and new construction. Not only is ship work expanding again somewhat, but inventories stand in need of better balancing because of the curtailment in shipments as a result of the steel strike. Other consumers, as well, are specifying more actively in an effort to round out stocks, although a number of others still are strike-bound. Much hope for any relief lies in filling of such orders as mills may already have scheduled, for delivery promises on new orders are well extended. Some occasional lots can be had for shipment in first half, but these are quite the exception. Most producers are quoting fourth quarter shipment, with only little at best available in third quarter. Recent advance of $5 a ton, retroactive to Feb. 15, has brought the plate market here up to 2.69c, delivered.

**Philadelphia** — Plate demand is tightening, losing its irregular aspect of a week or two ago. Pressure for 3/16 and ¼-inch plate appears even greater than ever and there is a wider diversification of demand for plates in general, despite the fact that certain large consumers in the East are still down as a result of labor trouble. While at least one large producer appears abolt to work in moderate tonnage for delivery early in third quarter, most producers are quoting little before fourth quarter and some assert they have little left even for that period. One district mill continued down at the week end, not yet having signed a new contract with its employes. The recently announced $5 advance places the plate market here at 2.55c, delivered. This increase in the

base price wipes out the premium that one district mill has enjoyed.

**Boston** — The first large postwar tonnage for shipbuilding, about 10,000 tons, mainly plates, has been placed with two producers by Bath Iron Works, Bath, Me. The steel, which also includes shapes and bars, is for 32 trawlers for France. Delays in getting back into production has forced some mill deliveries back to December and beyond, with floor plates in September. Heads, spun and pressed, also are more extended, ranging up to 20 weeks, and tank builders are hampered in striking a balance between welding quality plates in light gages and the required heads. On the average delivery schedules are extended about two months and considerable production is being revised. Mills are heavily loaded with 3/16 and ¼/in. sizes. As most plate fabricators have been operating, inventories are generally low and out of balance. Pressure for deliveries against old orders therefore is heavy.

**Birmingham** — Plate inquiry, while substantial, is not in anticipated volume. Postponement of some projects until a more favorable time is given as one of the reasons, although the easing is described as temporary.

## Wire . . .

Wire Prices, Page 153

**Boston**—Revisions in wire extras are expected to lift average prices somewhat above $6 per ton, with controls off most fine wire and specialties. The $3 advance in rod prices is not likely to release much additional tonnage for non-integrated producers operating under the Worcester base. Selectivity as to acceptance of orders is most likely to continue, reflected in low production in some items, as in case of round-edge flat wire. Output of this and other products is down sharply. Rescheduling and revisions in quotas goes ahead under heavy pressure for drawn wire on part of consumers, many with low inventories. Aggregate production is disappointing thus far, with several wire mills still down and others limited by rod supply. Some rod mills are producing their first steel since the strike this week.

**Pittsburgh** — Manufacturers wire and merchant quality wire, all types and finishes except such wire as is suspended from price control under Amendment 6 to Supplementary Order 129, have been advanced 30 cents per 100 pounds to $3.05 at regular basing points, effective Feb. 15. Nails and staples, all types and finishes except miscellaneous nails and brads priced on a list and discount basis, are up 35 cents per 100 pounds to $3.25, Pittsburgh; twisted barbless and barbed wire also are up 35 cents per 100 pounds; wire fencing and woven, chain link and lawn, have been advanced 25 cents per 100 pounds; bale ties, all types, are up 32½ cents per 100 pounds; fence posts, all types and accessories, 25 cents per 100 pounds; and wire rods, all types and grades, up 15 cents per 100 pounds.

**Birmingham**—Wire products are in high demand throughout the Southeast. Drawn wire is not available in needed quantities. Wire fencing is in great demand from agricultural sources.

## Tin Plate . . .

Tin Plate Prices, Page 153

**Pittsburgh** — Coke tin plate is now quoted at $5.25 per base box Pittsburgh; 0.75-pound electrolytic, $4.90; 0.50-pound, $4.75; and 0.25-pound, $4.60. Special coated manufacturing ternes are up 25 cents to $4.55; tin mill black plate to $3.30 per 100 pounds for No. 29 gage and lighter. Canmaking black plate, 118 pound, and lighter, is now quoted on a base box basis, with deductions from coke tin plate. Above advances are effective as of Feb. 15.

CPA has reinstated 152,000 tons of the original 215,500 tons of tin plate scheduled for export during first half of 1946. It is believed that this export tonnage could better be handled through July than by the end of June, for domestic requirements for food pack and other essential needs will take nearly all of projected output. No intimation is available on the anticipated revised addition of container order M-81 expected to be released soon.

Tin plate production is gradually gaining momentum, although most shipments to date represent material from mill warehouse stocks or tonnage well along in processing prior to the strike.

**Chicago** — Tin plate operations in this district have been increased but are still below prestrike level. Part of the lag is due to material bottleneck and part to lack of workers. Mills are sold out through first half. Within the past few days they have received directives against the 155,000-ton export quo-

ta established for last half of 1946. A canmaking plant has laid off about 300 employes, or 17 per cent of its personnel, because of shortage of tin plate. It is estimated that several weeks will be required for volume shipments to be restored.

## Rails, Cars . . .

Track Material Prices, Page 153

New York — Car demand remains quiet, with an order for 65 aluminum passenger cars for the Union Pacific outstanding. The equipment will be built at the St. Charles, Mo., shop of the American Car & Foundry Co.

Meanwhile, Russia has closed on 30 steam locomotives to Davenport Besler Corp., Davenport, Iowa, with new inquiries out from Poland and Greece for an indefinite number of steam locomotives. Polish requirements range from 50 to 500 engines.

## Structural Shapes . . .

Structural Shape Prices, Page 153

Boston — Inquiry for fabricated structural material has slackened and scattered tonnage has been held up for estimates. New awards include 7500 tons for an insurance building on which tenders were limited, due to firm bid requirements on the part of the contractor. For the same project 10,000 tons of bearing piles have been divided between Bethlehem Steel Co., Bethlehem, Pa., and Carnegie-Illinois Steel Corp., Pittsburgh, the largest tonnage placed in this district since before the war. Contracts also include several hundred tons for a paper mill addition at Rumford, Me., and the total tonnage under contract includes a substantial volume for the paper industry. Most larger industrial projects under contract contain escalator clauses covering the $5 advance in plain material and other costs. For some time fabricating shops of one of the two larger interests have been booking tonnage well in excess of shipments and backlogs are substantial, with deliveries on ordinary tonnage projects now in November for fabricated material, with plain material quotas extending into September. In general, however, plain material is beyond that month. Small shops with few exceptions are short of some sizes and are piecing out tonnage to meet current commitments. Before shape deliveries are resumed in normal volume some are likely to be pinched for material. That most public works will remain in cold storage during the shortage of material and labor is emphasized by advances in unit bids on the few being taken. As an instance, New Jersey has rejected bids on bridges taking 875 tons, as estimates were 45 per cent higher on the average over 1940 unit prices for bridge construction and 80 per cent higher for highway paving, including steel mesh and reinforcing.

Philadelphia — Although structural demand is irregular, shape producers are booked well into third quarter and there is every indication that when the labor situation becomes more stable shape demand in general will undergo further increase. One district shape mill has not resumed production since the steel strike. Two district fabricators have resumed operations during the past week, leaving at least one still down. The new increase still leaves one district shape mill, which had been permitted to sell at a premium, with an advantage of $2 per ton on the general range and $4 per ton on beams and channels from 4 to 10 inches.

Chicago — Awards of structural steel continue light and new inquiry is not developing in the volume maintained over the past several weeks. For one thing, higher construction costs are causing projects to be held in abeyance or to be redesigned to minimize expansions. While shipments of plain shapes from mills are resuming, sizes are restricted and fabricators are delayed in finishing jobs in the shop.

Buffalo — Fearful that the government is planning to invoke drastic regulations on commercial and industrial construction, local fabricators are pressing for deliveries. The pressure emanates from contractors who have a half dozen major private projects under way and are wary over talk that the jobs may be halted to divert material and labor into home building. One shape producer, who has been slow in returning to full production here, has been obtaining shipments from one of its plants located elsewhere.

Seattle — Fabricating shops face a crisis, as they expect no steel from eastern mills until June. Last shipments forwarded prior to the strike have arrived, transportation requiring 45 days, and no new material is expected for three months. Some materials have been obtained from government surplus but insufficient to supply demand. Until new steel shipments are received fabricators will take new business subject to priority and when material is available. Isaacson Iron Works has a con-

tract for 600 tons of shapes for a warehouse in Alaska for the Alaska Packers Association.

## Reinforcing Bars . . .

Reinforcing Bar Prices, Page 153

Pittsburgh — Reinforcing bars have been advanced 20 cents per 100 pounds to $2.35 at designated basing points. This advance excludes fabricated items, which come under regulation 159. Normally these items are 25 cents above new billet reinforcing bar prices. Although no decision has been reached it is thought probable the former spread in prices for these items will be maintained. Rail steel bars also have been increased 20 cents, making the Pittsburgh base price $2.35 per 100 pounds. Iron bars are expected to be advanced 8.2 per cent, but this also is still under discussion. Producers state tonnage involved in new inquiries is fairly heavy recently, although well under the unusually heavy volume reported last fall.

Chicago — Reinforcing steel suppliers find their lot unhappy by virtue of the treatment which OPA gave to reinforcing bars. For many months production of bars has been below requirements and it is unlikely that conditions will improve in light of the new price structure. Mills have no incentive to increase output, for it will be more profitable for them to put available steel in other products. Inquiry for reinforcing has dropped off and few awards have been made during the past two weeks. Not only are stocks low but some jobs are being held up through rising construction costs.

## Pig Iron . . .

Pig Iron Prices, Page 155

In spite of almost all available blast furnaces being back in service pig iron supply continues scarce and this condition is expected to continue for months. Lack of cast scrap causes heavier demand for iron. This condition faces a possible shortening of operations in case of a soft coal strike this spring, which would stop production of many furnaces. An increase in pig iron prices is expected as a relief to producers.

Cleveland—Demand for pig iron continues heavy and in excess of the industry's capacity. Although output is increasing steadily, production is still well below the prestrike level. Of the eight industry-owned stacks in this city, seven are in blast and one is being relined. Leading producers are filling second quarter books cautiously, allocating available tonnages on the basis of prewar experience. Producers are urging customers to observe the government's 30-day inventory restriction. The unusually heavy pressure for deliveries which consumers exerted during the weeks immediately preceding the general steel strike has eased, now that shipments have been resumed. Demand for increased deliveries will reassert itself soon, however, unless coal miners and operators come to an early agreement.

Pittsburgh—Sellers anticipate an increase in pig iron prices, rumored at $1.50 to $2 a ton, but nothing official from OPA has been released on this product although it is expected momentarily. Prospect of increased raw material cost on top of USA-CIO demand of 18.5 cents an hour has forced a few

foundries to remain closed until some decision is reached on their request for price relief. Pig iron supply is expected to fall well below requirements through the remainder of this year for such important reconversion industries as housing, farm machinery, automotive, railroad and consumer durable goods. Shortage of cast scrap is also a factor in the increased demand for pig iron. Unless additional stacks are brought into service soon for the merchant trade, there is expected a dearth of pig iron for many months. CPA recently stated that total demand of foundry and malleable grades prior to recent increase in the housing program was expected to exceed December output by from 60,000 to 190,000 net tons per month during 1946, depending upon proportions of pig iron and scrap used. Present low inventory position of both producers and consumers is not likely to be altered much this year. Currently pig iron output is above the prestrike level, with 48 out of 54 units active.

New York — In spite of the fact that some important consumers are still strikebound, there is a general improvement in melt, especially now that pig iron is beginning to move more freely. However, pig iron shipments are still well below normal and indications are there will be a shortage in iron for some weeks. Most consumers have less than 30 days supply, and some have less than a week's supply.

Boston — Pig iron deliveries are being widely distributed in small lots to enable a considerable number of foundries to maintain melting schedules. Steelworks also are operating close to margin and in some cases only timely arrival of iron prevents curtailment. Tonnage normally going to consumers who have been down on strike contributes several thousand tons to this gap but pressure for iron is so general from melters with inventories under 30 days there has been little easing in the general situation.

Buffalo — Merchant iron producers are giving considerable study to acceptance of orders for second quarter. Indications point to a complete clearance of total output, but sellers must act cautiously to reserve iron for some 35 area consumers who are still tied up by strikes and are not in the market for deliveries at this time. Canadian inquiries are being turned down as producers report pressure for deliveries to Seaboard, New England and Michigan melters. Automotive supply foundries are calling for additional tonnage. Shipments to the East are reported back to normal. First quarter production was off approximately 30 per cent as a result of strikes. Bethlehem's Lackawanna plant managed to get a second of seven blast furnaces into production, which boosted the area operating rate to 59 per cent of capacity, up six points. With another furnace blown in, Bethlehem recharged eight more open hearths.

Chicago — While pig iron has become a little more plentiful since the steel strike ended, it is still far below foundry requirements and prospects are that it will remain so for some time. Backlogs for castings are tremendous, and foundry labor is improving, but iron supply does not permit expansion of operations to the degree desired. Melters

have sought to utilize more scrap, but insufficient quantities are available. Some difficulties have arisen in restoring blast furnaces to action. As of late last week, only about 35 of the district's 41 were producing, as against 32 the week before. Heavy demand for basic iron for steelmaking limits the production of foundry grade.

**Cincinnati**—Books are being opened for pig iron orders for second quarter with most furnaces placing severe restrictions on tonnage, seeking to hold shipments to first quarter levels. This will block efforts of many melters to expand output to meet a persistent demand for castings. Shipments have been lagging slightly, causing some anxiety as all stocks are near exhaustion.

**Philadelphia** — Pig iron is expected to continue in tight supply for some time. Furnaces are getting back into operation slowly. Steelmakers are seeking more basic in order to step up their operations and iron foundries, with much business on books and with an increasing labor supply, are pushing hard for tonnage. Some consumers still are down because of labor trouble but overall demand is expanding, with most inventories below the 30-day limit set by Washington. One district producer is not expected to get into production of foundry iron before April, now working on urgent requirements for basic.

**Birmingham**—Merchant iron melters report supply of pig iron is lagging considerably behind demand at the moment, partly at least, because of the steel strike. The advent of new foundries in the Southeast also is a contributing factor with the result that demand for iron is greater than at any time in recent years, even during the war. Pig iron interests declare they will continue to press for price relief, especially in view of wage demands with which they are currently confronted.

## Scrap . . .

Scrap Prices, Page 156

Lack of industrial scrap seems the principal cause for shortage, a number of the most important users of steel now being strike bound, with no scrap coming from their plants, which usually supply a large volume. Steelmakers are seeking further supplies, in spite of accumulations gathered during their idle period. Brokers find it difficult to find tonnage at all requirements. Prices are steady at ceilings and some unprepared government material has been taken by dealers above ceiling.

**Pittsburgh** — Key to present acute scrap shortage is lack of production scrap. With many metalworking companies still closed, including such major sources of supply as General Motors Corp., Westinghouse Electric Corp., and General Electric Corp., scrap movement in recent weeks has been far below normal. Shipments in this area during the strike dropped to 20 per cent of the prestrike level and little improvement has developed since steel producers resumed operations. Quantity of railroad scrap available also has been well below normal as illustrated by fact that for second consecutive month the Pennsylvania Railroad's list did not include any steel rails. Cast scrap supply has been inadequate to meet the increasing demand from foundries. During the strike period some basic steel producers were able to augment stocks slightly, but additions to stock piles are considered wholly insufficient in face of near capacity operations scheduled for the near future. Prior to the strike producers' stocks were inadequate, in some instances consumers were using low phos scrap in open hearths. Indicative of the keen bidding for available scrap, is the recent award of 5000 tons of unprepared material by the Third Service Command, Norfolk, Va., at $14.56, or $1.01 above ceiling, to Luria Bros. & Co. Inc.

**Boston** — Limited volume of steel and cast scrap coming out is readily absorbed, demand for both being in excess of supply. Unprepared scrap is scarce and volume of industrial scrap continues low. While about half a dozen foundries have been down this has eased pressure for cast only slightly. Tonnage of terminated contract scrap has been below expectations, although offerings tend upward slightly. Much of the unsold in surplus will probably go as scrap eventually, due to outside storage and other deterioration. Prices offered for government shop account accumulations over the next few weeks are firm at ceilings and 400 tons of No. 2 steel at the Boston Navy Yard went to Washburn Wire Co., Phillipsdale, R. I., although that producer usually buys only No. 1.

**Cleveland** — Dealers continue busy seeking scrap to fill needs of mills but find difficulty obtaining sufficient. Industrial scrap is scarce as fabricators are not yet back to normal and are not processing as much steel as usual, this limiting scrap production. Yards also find their supply lessened, sometimes insufficient to maintain usual operations. Cast scrap is especially scarce. All available material is being accepted by steelmakers in spite of accumulations made during the strike.

**Cincinnati** — Melters show even greater eagerness for iron and steel scrap, against a supply which is abnormally low. Tightness is most prominent in cast and short rails. Brokers are going far for steel and bundles to supply a demand willing to pay high freight charges. Overall tonnage has been shrinking because of stoppages in production scrap and of lighter railroad lists.

**St. Louis** — Scrap dealers throughout the strike had trouble meeting scrap demand and there has been no improvement in supply since. Pressure is increasing but few new orders are being accepted. Shipments are slow, due to labor shortage and because some dealers are unwilling to buy and prepare scrap under increased costs. No improvement is predicted for several months. Mill scrap reserves are well above 30 days. Heavy melting and cast iron are scarce. A decline in the railroad scrap supply is attributed to a reported hope by carriers that ceilings will be raised.

**Birmingham** — Scrap has eased somewhat in the past two weeks, although most grades remain relatively short. All prices are at ceiling, and movement is under way again after the recent embargo. Improved weather conditions have resulted in somewhat better supply.

**Chicago** — Consumers of scrap are aggressively seeking to purchase as their

melting operations move up to more nearly normal levels, but find material scarce. Production scrap is not available in volume, because users of steel were forced to curtail operations when supply became exhausted and new material is not yet being received in sufficient quantity to restore schedules. Even blast furnace material is being sought actively. Chief shortage, however, is in heavy melting grades, and this is likely to remain short for weeks. Alloy scrap is in longest supply and shortest demand. With pig iron tight, foundries are trying to offset with more scrap and without any degree of success. Prices hold firmly at ceiling.

**Philadelphia** — While there is at least temporary easing in supply of unprepared scrap, the situation in prepared material remains tight. Industrial scrap is coming out somewhat more freely but still is well below prestrike volume. All leading district consumers of melting steel scrap, except three which still are down as a result of labor trouble, now are taking scrap as fast as sellers can supply it. Luria Bros. & Co. recently bid above ceiling for 5000 tons of landing mat scrap at Norfolk, Va., with a bid of $14.56 and at the ceiling of $14.01 to get 3000 tons of unprepared scrap at Philadelphia Navy Yard. Several buyers shared in 4000 tons of unprepared government scrap at Frederick, Md., with successful bids ranging from $14.37 to $15.37, f.o.b. Frederick, all above ceiling.

**Buffalo** — Two dealers have inserted an OPA ceiling price clause in contracts, but the feeling generally is that present levels will remain intact. Concern, however, over scrap shortage grows and dealers are of the opinion that higher prices are needed to swell supplies. It is pointed out that auto wreckers find it more profitable to hold vehicles and peddle the parts. Collectors also find it unprofitable to pick up farm and agricultural scrap. Dealers believe that price increases of $2.50 to $5 a ton would spur the movement of scrap from both these sources. Raising ceilings $1 or $2 a ton would not be enough, the dealers argue. Dealers point out that present OPA ceilings were established in April, 1941, and that finished steel prices and other items have been boosted considerably since then. Termination scrap is light and made up mostly of nonferrous grades.

**New York** — While scrap demand in general continues strong one large eastern Pennsylvania consumer of melting steel appears in somewhat easier position, with rejections more numerous. Because of active buying in the East, Pittsburgh inquiry has slowed, although any strong indication that requirements of eastern consumers were becoming satisfied would soon result in a stronger demand from Pittsburgh melters, it is believed.

## Warehouse . . .

Warehouse Prices, Page 154

**Pittsburgh** — OPA action permitting steel distributors to reflect in their prices on shipments as of March 1 and thereafter the recent price advances granted steel producers will not benefit steel warehouse interests to the extent generally believed because inventories are nearly depleted. Little of the limited

mill production to date has gone into warehouse steel stocks. Distributors see slight possibility of obtaining delivery preference on mill rolling schedules to permit rebuilding of inventories. Stocks of hot and cold-rolled sheets in lighter gages, galvanized sheets, merchant wire products, light structurals and small size bars are lowest in history for nearly all steel distributors. Most new inquiries are not being filled for warehouses are cut of many sizes specified. Many inquiries originate from other than in this area, indicating extensive shopping by consumers. A trickle of surplus war steel is being channeled into warehouse steel stocks for wider distribution, but tonnage involved is wholly inadequate and frequently is not of required specifications.

**Cincinnati**—Warehouses are receiving a few cars of steel but this fresh supply is small in contrast to demand. Stocks of wanted items were nearly depleted during the shutdown of mills, and the expected lag in replacement tonnage may cause volume of deliveries this month to sag badly. Sheets are exceedingly scarce. Some jobbers anticipate early improvement in supply of structurals against an increasing demand.

**Philadelphia** — Jobbers anticipate some improvement in the daily rate this month but with the voluntary restrictions in trading, proposed by Washington during the steel strike and expected to be observed for a while, and with incoming shipments increasing slowly, they do not see a return to prestrike level for some time. Decline in the daily tonnage rate last month amounted to 40 per cent, and even more in some cases, due mainly to shrinkage in stocks and conservation selling, although suspension of operations at some consuming plants was a factor. Effective March 2, distributors made general revisions in price schedules, being permitted by OPA to pass along increase in mill prices. Some jobbers expect further advances some time later, to cover at least in part increases in their own wage rates.

## STRUCTURAL SHAPES . . .

### STRUCTURAL STEEL PLACED

10,000 tons, bearing piles for John Hancock Insurance Co. office building at Boston; divided equally between Bethlehem Steel Co., Bethlehem, Pa., and Carnegie-Illinois Steel Corp., Pittsburgh.

4500 tons, Governors Island shaft of Brooklyn-Battery tunnel, to Bethlehem Steel Co., Bethlehem, Pa., through Grow Construction Co., New York.

3500 tons, addition to steel mill, Fontana, Calif., for Kaiser Co. Inc., to Bethlehem Steel Co., Bethlehem, Pa.; bids Jan. 16.

800 tons, Harkness Pavilion, New York medical center, to Harris Structural Steel Co., New York, through Vermilyea-Brown Engineer.

800 tons, steel sheet piling for seawall at Hampton Beach, N. H., to Carnegie-Illinois Steel Corp., Pittsburgh.

700 tons, 24 dormitory buildings, Omaha, to Gate City Iron Works, Omaha; Peter Kiewit Sons Co., Omaha, contractor.

700 tons, additions to buildings 51 and 52, Laporte, Ind., for Allis-Chalmers Mfg. Co., to Mississippi Valley Structural Steel Co., Decatur, Ill.

600 tons, warehouse in Alaska for Alaska Packers Association, to Isaacson Iron Works, Seattle.

570 tons, DPG bridge No. 919, Eau Claire, Wis., for State Highway Commission, to Bethlehem Steel Co., Bethlehem, Pa.; bids Feb. 14.

500 tons estimated, papermill addition at Rumford, Me., to American Bridge Co., Pittsburgh.

300 tons, gates for Keswick dam, Redding, Calif., for U. S. Bureau of Reclamation, to American Bridge Co., Pittsburgh.

285 tons, bakery for Burry Biscuit Co., Myerstown, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

200 tons, Western Electric Co. office building, Allentown, Pa., to Lehigh Structural Steel Co., Allentown, through Austin Co., New York.

150 tons, Pennsylvania state highway bridge, Columbia county, to American Bridge Co., Pittsburgh, through Coon Construction Co., Luzerne, Pa.

Unstated, hydraulic hoists and other equipment for Grand Coulee dam, to McKiernan-Ferry Corp., Harrison, N. J., $378,935.

### STRUCTURAL STEEL PENDING

1600 tons, sheet piling, dock wall and mooring basin, Milwaukee, for city; bids March 6.

875 tons, five highway overpasses, route 25, sections 32A and 16C, Newark and Elizabeth, N. J.; all bids rejected by Spencer Miller Jr., New Jersey State Highway Commissioner, Trenton, with plans proposed for bringing out the overpasses separately for figuring at some future dates.

281 tons, bridge, Ray County, Mo., for State Highway Commission.

230 tons, railroad overcrossing, King county, Washington; general contract to Neukirch Bros., Seattle, at $178,950.

210 tons, bridge, Sanderson, Tex., for State Highway Commission.

200 tons, all-welded building, General Electric Co., West Lynn, Mass.

140 tons or more, also 58 tons plates, Cascade dam, Boise, Idaho; bids to Reclamation Bureau, Boise, March 21.

125 tons, towers for Virginia Electric Power Co., Bellwood, Va.; Stone & Webster Engineering Corp., Boston, contractor.

## REINFORCING BARS . . .

### REINFORCED BARS PLACED

1750 tons, Bluestone dam, Hinton, W. Va., to Jones & Laughlin Steel Corp., Pittsburgh, through Dravo Corp., Pittsburgh.

400 tons, expansion, Milwaukee, for Schlitz Brewing Co., to W. H. Pipkorn Co., Milwaukee.

365 tons, Harms road sewer, Glenview and Morton Grove, Ill., for Chicago Sanitary District, to Carnegie-Illinois Steel Corp., Chicago; Santucci Construction Co., Skokie, Ill., contractor; bids Feb. 14.

350 tons, separator tanks, Toledo, O., for Standard Oil Co. of Ohio, to Carnegie-Illinois Steel Corp.

300 tons, lime kiln plant, National Gypsum Co., Kerns, Va., to Bethlehem Steel Co., Bethlehem, Pa., through George A. Fuller Co., New York.

260 tons, building, Chicago, for American Colortype Co., to Bethlehem Steel Co., Bethlehem, Pa.; S. N. Nielsen Co., Chicago, contractor; bids Feb. 4.

### REINFORCED BARS PENDING

1225 tons, flood protection, Elmira, N. Y.; bids March 25 to Army engineers.

515 tons, state highway department, Frankfort, Ky., bids in.

303 tons, Cascade dam, Boise, Idaho; bids to Bureau, Boise, March 21.

290 tons, expansion, St. Louis, for Wagner Electric Corp.

266 tons, R-187, Section 8-A, Westmoreland county, Pennsylvania; bids March 12.

260 tons, mill room addition, Chicago, for

Dryden Rubber Co.; bids March 4.

203 tons, R-168, Section 11-B, Lackawanna county, Pennsylvania; bids March 12.

165 tons, state overcrossing King county, Washington; general contract to Neukirch Bros., Seattle.

150 tons, bottling plant, Minneapolis, for Coca Cola Co.; Standard Construction Co., Minneapolis, contractor.

130 tons, state concrete bridge, Chelan county, Washington; general contract to Cascade Construction Co., Seattle.

## PLATES . . .

### PLATES PLACED

10,000 tons estimated, for 32 trawlers for French government, to be built by Bath Iron Works, Bath, Me., 60 per cent to Carnegie-Illinois Steel Corp., Pittsburgh, 40 per cent to Bethlehem Steel Co., Bethlehem, Pa.

Unstated, asphalt plant near Portland, Oreg., for Standard Oil Co., to Chicago Bridge & Iron Co., Chicago.

## PIPE . . .

### CAST IRON PIPE PLACED

425 tons, six to 14-inch, Framingham, Mass.; to Warren Pipe Co., Everett, Mass.

135 tons, eight-inch, Taunton, Mass., to Warren Pipe Co., Everett, Mass.

100 tons, four to 10-inch, Westfield, Mass., to Warren Pipe Co., Everett, Mass.

### CAST IRON PIPE PENDING

Unstated, about 50,000 feet 10 to 2-inch cast iron pipe, for Maplewood water district, Portland, Oreg.; bids to C. E. Carter, engineer, March 13.

## RAILS, CARS . . .

### RAILROAD CARS PLACED

Union Pacific, 65 aluminum bodied passenger cars, to American Car & Foundry Co., for construction at St. Charles, Mo.; includes 8 lunch-counter diners, 9 club-lounge cars, 6 dormitory-club cars, 3 cafe-lounge cars, regular diners, baggage and mail cars.

### LOCOMOTIVES PLACED

Russia, thirty 0-6-0 locomotives, to Davenport Besler Corp., Davenport, Ia.

### LOCOMOTIVES PENDING

Greek Ministry of Transport, 8 to 33 steam locomotives of different types; bids asked.

Polish Supply and Reconstruction Mission, 50 to 500, 2-10-0 steam locomotives; inquiries pending.

## Industry Will Face Price, Supply Problem for Months

(*Concluded from Page* 65)

several in labor rates. He hopes to get higher prices.

Abrasives—W. T. McCargo, regional sales manager, Carborundum Co., Niagara Falls, N. Y., expects 1946 business will run about twice that of 1939. Business in 1945 was about three times as great and in 1943, the peak year, it was four times as large. Production reached its alltime peak in March, 1943. At that time demand was running about six times manufacturing capacity. Production in January, 1946, was ahead of the corresponding 1945 month. He expects no change in prices in 1946.

## Kaizer-Frazer Urge Steel Allocation To Ease Pinch

(*Concluded from Page* 65)

is so critical that in addition to leasing the aluminum plants, we are also studying available DPC steel plants. At South Chicago, for example, there is a government-owned, war-built $93 million steel plant for which competitive bids are to be received April 1, by the War Assets Corp. We are investigating this plant with the thought in mind that there may be ample floor space to increase its facilities and to install a strip mill for the rolling of steel sheets. If our studies show it is economically sound, we will be among the bidders making a proposal to the War Assets Corp.

"In our opinion," reads the Kaiser statement, "the consumer demand for products requiring sheet steel is so great it will require the operation, for at least three years, of all the steel capacity of the United States, including the additional capacity installed during the war.

"Again I say, the only way to reduce government controls is to use all of our existing facilities for production, and to build, where necessary, new facilities to give us increased production and meet the demand. Congress has already done its part in providing the Surplus Property Administrator with ample authority to make these plants quickly available to industry, after a check by the Attorney General to insure they are so allocated that competition is encouraged."

Officials of the leading steel producing companies supplying the automotive industry deny there is a conspiracy to keep the Kaiser-Frazer interests from obtaining automobile sheets and other steel products.

They point out that all the sheet producers are booked far ahead, some for almost the entire current year and have made delivery promises on the tonnages they expect to turn out. The steel strike resulted in pushing shipping dates further into the future. It is estimated that as a result of the recent steel strike, approximately 2,000,000 net tons of sheets and about 1,000,000 net tons of bars were lost.

Commenting on the Kaiser charges, Benjamin Fairless, president, United States Steel Corp., said: "We are not discriminating against anyone. The fact is, we simply do not have the steel. Because of the strike there is no steel available and steel mills have not yet gone into sufficient production to supply demands."

T. M. Girdler, chairman, Republic Steel Corp., replying to the Kaiser statements said:

"On Tuesday, Feb. 19, Joseph W. Frazer and Edgar Kaiser called on me at my office and requested that Republic sell the Kaiser-Frazer Corp. a substantial tonnage of flat-rolled steel products. I advised them that all of Republic's production of flat-rolled products for 1946 had already been allocated among Republic's regular prewar customers on the basis of their regular purchases of such products from Republic during prewar years; that even on this basis Republic falls far short of having enough tonnage to supply the demands of its regular customers; that consequently Republic is unable to take on any new customers at this time for the flat-rolled products.

"I emphatically deny that I ever stated to Mr. Frazer or to Mr. Kaiser that the wage settlement at Fontana had affected the attitude of steel producers in the matter of supplying steel to Kaiser-Frazer. I have not had any conversation whatsoever with any executive of any other steel company regarding the wage settlement at Fontana or the supplying of steel to Kaiser-Frazer."

Even before the steel strike the supply situation in steel was extremely tight. As early as last fall the steel producers had been forced by the pressure of demand to put into effect a voluntary system of quota distribution of available steel based upon prewar normal demand of consumers. This practice was adopted to provide as equitable distribution as possible. However, the tight supply situation has become increasingly difficult from month to month so that delivery promises have progressively pushed further into the future.

### CPA Continues Inventory Restrictions

Civilian Production Administration has continued tight inventory restrictions in effect to prevent hoarding of steel. Under direction 6 to PR 32, consumers' inventories are limited to a 45-day supply. Last month CPA Administrator Small stated priority ratings outstanding prior to the steel strike, which were suspended on Jan. 22, would continue suspended in order to allow producers the greatest latitude in spreading steel deliveries to the largest number of consumers until steel production again reaches high levels. This suspension was to continue in operation until steel production reached such levels that overall production will not be injuriously affected by the issuance of specific preference ratings. At the same time Administrator Small pointed out " it is clear that steel producers cannot, for a time, meet the demands for steel required to maintain production at the level prevailing before the strike. Practically every steel user will be in hardship status due to lack of steel."

# CONSTRUCTION AND ENTERPRISE

## CALIFORNIA

GLENDALE, CALIF.—U. S. Engineering Co., 308 East Colorado St., is building a shop structure at 521 Commercial St., 40 x 100 feet, to cost about $15,000.

LOS ANGELES—Atwood Machinery Co., 931 Santa Fe Ave., is building a storage building at 695 Santa Fe Ave., 50 x 100 feet, to cost about $15,000.

LOS ANGELES—Metal Fabricators, 814 North Broadway, is erecting a plant building at 2971 Partridge Ave., 60 x 160 feet, to cost about $28,500.

LOS ANGELES—Absco Welded Products is erecting a plant building at 1522 North Indiana St., to cost about $14,700.

LOS ANGELES—Ford Motor Co., Dearborn, Mich., has permit for erection of assembly plant at 5801 South Eastern Ave., Slauson district, to cost about $1,500,000.

LOS ANGELES—A. W. Anderberg is building a machine shop 77 x 136 feet at 3727 Broadway Place, to cost about $22,000.

LOS ANGELES—Plomb Tool Co., 2209 Santa Fe Ave., has let contract to William J. Moran Co., 1011 South Fremont Ave., Alhambra, Calif., for a storage building and ramp, to cost about $24,000.

LOS ANGELES—Powdered Metal Products has been formed by Robert W. Sunclair and has established operations at 1438 North Wilcox Ave.

LOS ANGELES—Wagner Machinery Co. has been organized by Frederick Wagner and has located its operations at 1426 Santa Fe Ave.

LOS ANGELES—States Batteries, 1627 Santee St., has let contract to Row Construction Co., 1966 Newport Ave., Pasadena, Calif., for a one-story 120 x 175-foot plant.

LOS ANGELES—U. S. Porcelain Enamel Co., 4635 East 52nd St., has let contract to J. E. Dealy, 3644 Olympiad Dr., for a 100 x 300-foot plant, to cost about $150,000. H. W. Underhill, 4958 Valley Ridge Rd., is architect.

LYNWOOD, CALIF.—Columbia Mfg. Co., has been organized by Darwin Maxson and H. A. Delacamp and has engaged in manufacture of water heaters at 2551 Fernwood Ave.

MARE ISLAND, CALIF.—Bureau of Yards & Docks, Navy Department, has let contract to Peter Kiewit Sons Co., 442 Post St., San Francisco for buildings and services for reserve fleet berthing, at $891,647.

SAN PEDRO, CALIF.—Quality Machine Works, 246 Fries Ave., has let contract to Stephen M. Cope, 307 Avalon Blvd., Wilmington, Calif., for a shop and office building 40 x 80 feet, to cost about $95,000.

## CONNECTICUT

BERLIN, CONN.—Stanley Chemical Division of Stanley Works has let contract to Hasson & Downs, 55 West Main St., New Britain, Conn., for a two and 2½-story plant building, to cost about $75,000.

HAMDEN, CONN. — Hamden Smelting Co. Inc., Edmund St., has plans by S. Gitlitz, 124 DeWitt St., New Haven, Conn., for a one-story plant building 110 x 140 feet, to cost over $40,000.

ROCKY HILL, CONN. — Chemical Coatings Corp., E. H. Christ, president, is having plans prepared for a manufacturing plant on Dividend Rd., to cost over $40,000.

STRATFORD, CONN.—Tilo Roofing Co., 347 Longbrook Ave., has let contract to E. & F. Construction Co., 94 Wells St., Bridgeport, Conn., for a two-story 60 x 120-foot plant addition, to cost about $55,000.

## ILLINOIS

CHICAGO—Central Steel & Wire Co., 300 West 51st St., has let contract to E. J. Marhoefer Jr. Co., 222 North Bank Dr., for a one-story 100 x 600-foot warehouse. (Noted Jan. 21.)

CHICAGO—Viking Automatic Sprinkler Corp., 320 North Elizabeth St., has let contract to R. Benson, 4744 West Rice St., for a one-story 107 x 126-foot plant, to cost about $100,000. V. Charn, 4744 West Rice St., is architect.

CHICAGO—Griffin Wheel Co., 445 North Sacramento Ave., has let contract to J. W. Binder, 5529 West Gladys St., for a plant and machine shop, estimated to cost about $50,000.

## INDIANA

EAST CHICAGO, IND.—Sinclair Refining Co., 630 Fifth Ave., New York, has let contract to C. F. Braun Co., 1000 South Fremont Ave., Alhambra, Calif., for an oil refinery, to cost about $1 million.

FORT WAYNE, IND.—Central Motor Parts Inc., 421 North Capital St., Indianapolis, has let contract to E. F. Cramer Construction & Engineering Inc., 3560 North Sherman Dr., Indianapolis, for a 98 x 150-foot plant at 413 West Main St., estimated to cost $40,000.

FORT WAYNE, IND.—General Tool, Die & Engineering Co., West Superior St., has let contract to W. P. Schenkel & Son, 1212 Putnam St., for a one-story 55 x 99-foot plant building, estimated to cost about $45,000.

MUNCIE, IND.—Warner Gear Co. plans erection of a one-story plant addition on Yorktown Rd., to cost $75,000, with equipment.

## LOUISIANA

GRETNA, LA.—Southern Cotton Oil Co. plans a modern new refinery. Graham, Anderson, Probst & White, 80 East Jackson Blvd., Chicago, are architects.

NATCHITOCHES, LA. — Tennessee Gas & Transmission Co., Commerce Bldg., Houston, Tex., has plans in preparation for a 9000-hp compressor station, to cost about $900,000.

## MARYLAND

CUMBERLAND, MD.—Air Reduction Co. Inc., Lincoln Bldg., New York, plans a chemical plant at Cumberland, to cost over $150,000.

## FLORIDA

JACKSONVILLE, FLA.—Argonaut Realty Division of General Motors Corp., Detroit, has let contract to George D. Auchter, East Adams St., for a $500,000 branch of Electro-Motive division, 100 x 300 feet. Plant will be parts warehouse and service repair shop for all railroads in Southeast using General Motors Locomotives.

MIAMI, FLA.—Florida Power & Light Co., Ingraham Bldg., has plans for 42,000-kw steam electric generating station near here; similar station planned for Riviera, Fla.

TARPON SPRINGS, FLA. — Victor Chemical Works, W. B. Brown, vice president, is having plans prepared for an electrical phosphorus plant, estimated to cost about $2 million.

## MICHIGAN

DETROIT—Metal Mfg. Products Inc., 924 Ford Bldg., has been incorporated with 1000 shares no par value to manufacture machine tools, by Benjamin S. Warren Jr., same address.

DETROIT—Carbide Tool Co., 956 Harper Ave., has been incorporated with $50,000 capital to manufacture and regrind carbide tools, by Donald M. Woodruff, same address.

DETROIT—Delta Mfg. Corp., 515 Lieb St.,

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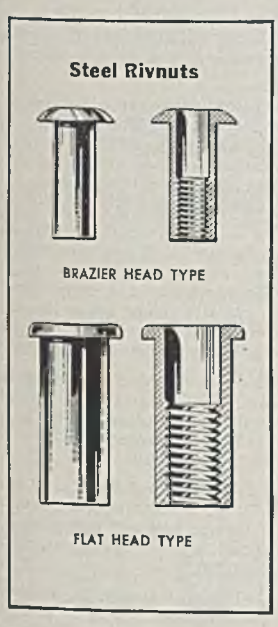
## now made of
# STEEL

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**Now**—in stainless or plated steel—the one-piece blind fastener that can be used to fasten *with* and/or fasten *to*. Standard sizes 6, 8 and 10-32. With slight adjustment, standard Rivnut hand tools can be used for installation.

All Rivnuts, used as rivets, can be sealed with a drive plug (hammered in place) or with a plug screw which keeps threads intact. Cadmium-plated attachment screws are available.

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Principle of Rivnuts, installation procedures, complete data on lighter aluminum Rivnuts, and new supplement on brass and steel Rivnuts. For your free copy, write to The B. F. Goodrich Company, Dept. S-3, Akron, Ohio.


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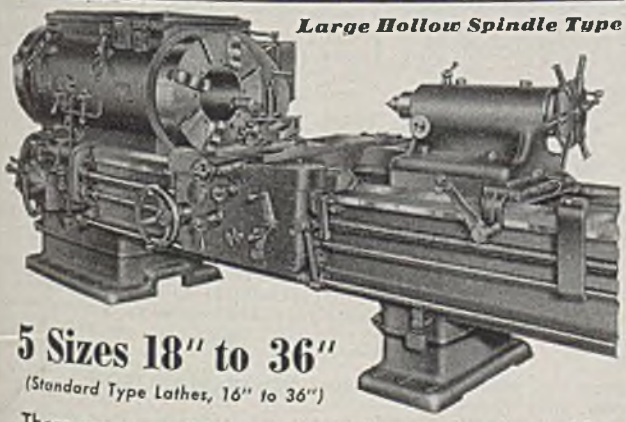

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*(Standard Type Lathes, 16" to 36")*

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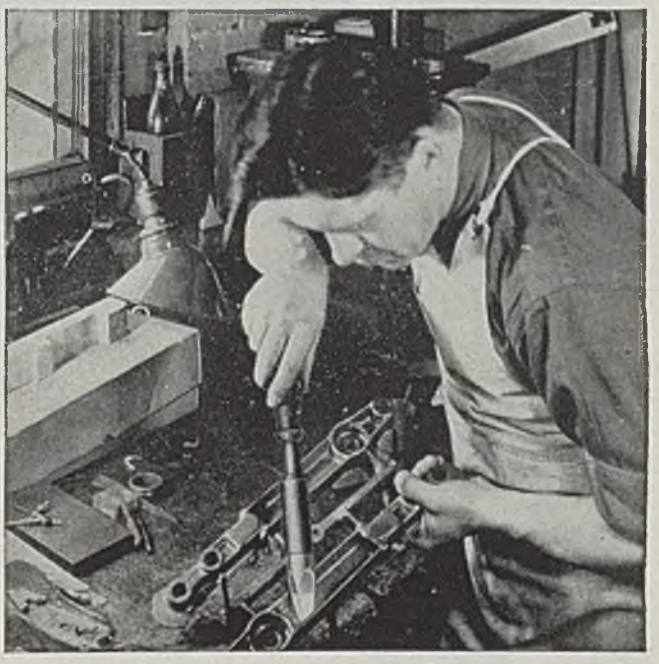
# FLUX



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- Hundreds of flux formulas have been developed during Kester's 47 years of business, and each one has been time-tested, both in laboratory and plant. So that today, not only is the performance of each definitely known, but also the circumstances under which one or another should best be used.
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4222 Wrightwood Avenue, Chicago 39, Ill.
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**KESTER**
*Solder Fluxes*
STANDARD FOR INDUSTRY

has been incorporated with $50,000 capital to do general machining, metal fabricating and finishing, by George L. DeVos, 572 Pemberton Rd., Grosse Pointe, Mich.

DETROIT—Marvin A. King Mfg. Co., Inc., 3369 Gratiot Ave., has been incorporated with $50,000 capital to manufacture chromium furniture, by Michael A. Whalen, 4725 Westlawn Ave.

DETROIT—Central Stamping & Mfg. Co., 8763 West Jefferson Ave., has been incorporated with $25,000 capital to operate a stamping and assembly shop, by Tony DeMarco, 8415 Harper Ave.

GRAND RAPIDS, MICH.—Commercial Grinding & Mfg. Co., 942 Lake Drive SE., has been incorporated with $50,000 capital to manufacture metal parts, by Charles C. Sabo, same address.

GRAND RAPIDS, MICH.—Aluminum Fabricators Inc., 932 Michigan Trust Bldg., has been incorporated with $100,000 capital to manufacture ferrous and nonferrous metal products, by Charles A. Schrader, 1008 Franklin St. SE.

LEONARD, MICH.—Gravicast Inc., Rochester Rd., has been incorporated with $50,000 capital to manufacture nonferrous cooking utensils, by Herbert E. Brannon, same address.

MUSKEGON, MICH.—Universal Metal Stamping Co., 202 Muskegon Bldg., has been incorporated with $50,000 capital to manufacture metal stampings, by Edward Lelenge, rural route No. 1, Muskegon.

NEGAUNEE, MICH.—Superior Mfg. Co., 103 North Main St., has been incorporated with $15,000 capital to manufacture ferrous and nonferrous castings and parts, by E. J. Seifert, 4710 West Division St., Chicago.

RIVER ROUGE, MICH. — Ford Motor Co., Schaefer Rd., Dearborn, Mich., has plans under way by Giffels & Vallet, 1000 Marquette Bldg., Detroit, for a stripper building, to cost about $250,000.

ROYAL OAK, MICH.—Cast Metals Corp., 311½ Dequindre St., has been incorporated with $25,000 capital to operate a general foundry, by Richard H. Oberschulte, Box 76, Franklin, Mich.

## MINNESOTA

MINNEAPOLIS—Standard Iron & Wire Works, 1900 NE Third St., is having plans drawn by Armstrong & Schlichting, 411 Essex Bldg., for a one-story 100 x 200-foot factory building, to cost over $40,000.

MINNEAPOLIS — Char-Gale Mfg. Co., 3127 Hiawatha Ave., C. L. Johnson, president, has let contract to O. Madsen, 3844 16th Ave. S., for a one-story 150 x 650-foot plant building, to cost about $275,000. J. Dovolis, 4437 Portland Ave., is architect.

MINNEAPOLIS—Argonaut Realty Division of General Motors Corp., General Motors Research Bldg., Detroit, has let contract to G. F. Cook Construction Co., 2608 Nicolett Ave., for a one-story 186 x 361-foot distribution warehouse, to cost about $400,000.

MINNEAPOLIS—Stampings Inc. has let contract to W. A. South Co., 120 South Tenth St., for a one-story 50 x 250-foot plant building, to cost about $40,000. Jacobson & Jacobson, 623 Sexton Bldg., are architects.

## MISSOURI

ST. LOUIS—American Stove Co., 2001 South Kingshighway, is having plans drawn by Harris Armstrong, 3 Sappington Spur, Kirkwood, St. Louis, for a six-story administration and office building, to cost about $500,000. N. J. Campbell, 911 Locust St., is consulting engineer.

## NEW JERSEY

METUCHEN, N. J.—Ford Motor Co., Dearborn, Mich., has plans by Albert Kahn Associated Architects & Engineers Inc., 345 New Center Bldg., Detroit, for a power house, assembly plant and office, to cost about $500,000.

## NEW YORK

NEWBURGH, N. Y.—E. I. du Pont de Nemours & Co., du Pont Bldg., Wilmington, Del., has plans by the Ballinger Co., 105 South 12th St., Philadelphia, for a research laboratory to cost about $150,000.

## OHIO

CINCINNATI—Steelcraft Mfg. Co., C. L. Levinson, president, 16 East 72nd St., Carthage, O., plans erection of a plant to cost about $250,000.

CLEVELAND—Phillips Electric Inc. has been incorporated to succeed Phillips Electric Co., 1259 East 60th St., by William J. Phillips. A new location is being sought and equipment costing $15,000 will be bought. Electric crane repair facilities will be added.

CLEVELAND — Eaton Mfg. Co., 739 East 140th St., Joseph O. Eaton, chairman, announces improvement program to cost $7,500,000 for expansion and replacement of equipment; plants involved are at Cleveland; Battle Creek, Mich.; Marshall, Mich.; Saginaw, Mich.; Vassar, Mich. and Massillon, O.

CLEVELAND—J. & L. Machine & Tool Inc., 14800 Miles Ave., Lawrence A. Buckhold, president, will build a plant addition to cost about $13,000, to increase capacity for tool and machine manufacture.

COLUMBUS, O.—Ohio Fuel Gas Co., 99 South Front St., F. F. Fisher, superintendent, has program of constructing and rebuilding compressor stations in several locations, at cost of about $500,000.

MARION, O.—Universal Cooler Co. plans erection of plant additions costing about $100,000.

TOLEDO, O.—Mather Spring Co., C. Mather, president, 939 Walcott Blvd., plans a manufacturing plant on Dixie Highway, near Gordon bumper plant, to cost about $170,000.

## PENNSYLVANIA

CHESTER, PA.—Ford Motor Co., Dearborn, Mich., has plans by Irwin & Leighton, 1505 Race St., Philadelphia, for a parts plant to cost about $500,000.

## RHODE ISLAND

BRISTOL, R. I.—Bristol Mfg. Corp., Buttonwood Ave., has let contract to MacDonald Construction Co., 101 Hamilton St., Providence, R. I., for a one-story 60 x 200-foot and 30 x 60-foot mill and office building, to cost about $50,000. L. A. Gardiner, 612 Union Trust Bldg., Providence, R. I., is architect.

## TEXAS

BAYTOWN, TEX.—Humble Oil & Refining Co., 1216 Main St., Houston, Tex., plans a booster pumping station for a gasoline line, to cost about $40,000.

HOUSTON, TEX.—Ruska Instrument Corp., 4607 Bellaire Blvd., has let contract to F. Sharp, 1536 Welch St., for a reinforced concrete plant building, to cost about $70,000.

## WASHINGTON

LYNDEN, WASH.—Baker Cold Storage Co., has let contract to the Austin Co., 16112 Euclid Ave., Cleveland, for a quick-freeze and storage plant, to cost about $150,000.

TACOMA, WASH. — Independent Insulation Co. Inc., Smith Tower, has let contract to Hainsworth Construction Co., 3028 Western Ave., for an insulation manufacturing plant, to cost about $50,000. L. P. Fay, 707 East Prospect St., Seattle, is architect.

# EQUIPMENT . . . MATERIALS

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200-Ton Alliance 100' Span
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75-Ton Alliance 37' Span
75-Ton Alliance 78' Span
50-Ton Shaw 69'10" Span
40-Ton Alliance 82' Span
35-Ton Northern 22' Span
30-Ton Case 41' Span
30-Ton Morgan 77' Span
30-Ton Morgan 30' Span
30-Ton Niles 53'9" Span
30-Ton Reading 56' Span
25-Ton Bedford 50' Span
25-Ton Cleveland 106' Span
25-Ton P&H 70' Span
25-Ton Whiting 106' Span
25-Ton Whiting 82' Span
20-Ton Alliance 77' Span
20-Ton Cleveland 65' Span
20-Ton Morgan 77' Span
20-Ton Northern 60' Span
20-Ton P&H 51'4" Span
20-Ton P&H 39'6" Span
20-Ton Shaw 76'4" Span
20-Ton Shepard Niles 49'6" Span
15-Ton Alliance 50' Span
15-Ton Alliance 35' Span
15-Ton Cleveland 55'6" Span
15-Ton Cleveland 35' Span
15-Ton Morgan 77' Span
15-Ton Niles 32' Span
15-Ton Northern 53' Span
15-Ton Shaw 82' Span
15-Ton Shaw 77' Span
15-Ton Toledo 82' Span
15-Ton Whiting 74'8½" Span
12-Ton Morgan 56' Span
10-Ton Alliance 58'9" Span
10-Ton "American" 27' Span
10-Ton Case 31'9" Span
10-Ton Cleveland 38' Span
10-Ton Cleveland 50' Span
10-Ton Lane 50' Span
10-Ton Morgan 39'5" Span
10-Ton Morgan 77' Span
10-Ton P&H 57' Span
10-Ton Northern 34' Span
10-Ton P&H 37'4" Span
10-Ton P&H 48'10½" Span
10-Ton P&H 60' Span
10-Ton P&H 80' Span
10-Ton P&H 87'6" Span
10-Ton Toledo 36' Span
10-Ton Manually Operated
7½-Ton Erie 70' Span
7½-Ton P&H 30'6" Span
7½-Ton Shepard 36' Span
6-7-Ton Milwaukee 70' Span
6-Ton Shaw 23' Span
5-Ton "American" 10' Span
5-Ton Champion 37'6" Span
5-Ton Euclid
5-Ton Milwaukee 39'8" Span
5-Ton Milwaukee 66'9" Span
5-Ton Milwaukee 70' Span
5-Ton Northern 49'6" Span
5-Ton P&H 48' Span
5-Ton Shaw-Box 25' Span
5-Ton Shepard 40' Span
5-Ton Toledo 96' Span
5-Ton Whiting 80' Span
3-Ton P&H 46'4" Span
3-Ton Shaw 33' Span
3-Ton Whiting 57'3" Span
2-Ton Detroit 28' Span
2-Ton Louden 19'2" Span
2-Ton P&H 46'4" Span
2-Ton Shep. Niles 18' Span
2-Ton Shep. Niles 14' Span
1½-Ton Cleveland 25' Span
1½-Ton P&H 22'8" Span 34' Span
1-Ton Curtis 24' Span
½-Ton "American" 17' Span

Take advantage of the ECONOMY service by telephoning to us *collect,* which will enable us to discuss your requirements and present our suggestions.

*In addition to overhead cranes we can supply all types of shovels, cranes, draglines, tractors, or practically everything in the equipment field. May we have your inquiries?*

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**SPRING STEEL**

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Any part of 50,000 each size:

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3 1/8" - 6 3/16" and 8 5/32"

We have dies.

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1—16" *United Bar Mill,* including gear set, 3-high pinion stand, and two 3-high roll stands.

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A nationally known organization has an opening for a Sales Representative. If you have a wide acquaintance with the steel industry and are familiar with Rolls and Rolling Mill Equipment, write giving full particulars as to former experience. Your reply will be given confidential consideration. Members of our organization know of this advertisement.

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Squad boss for layout and design of strip and wire mill machinery.

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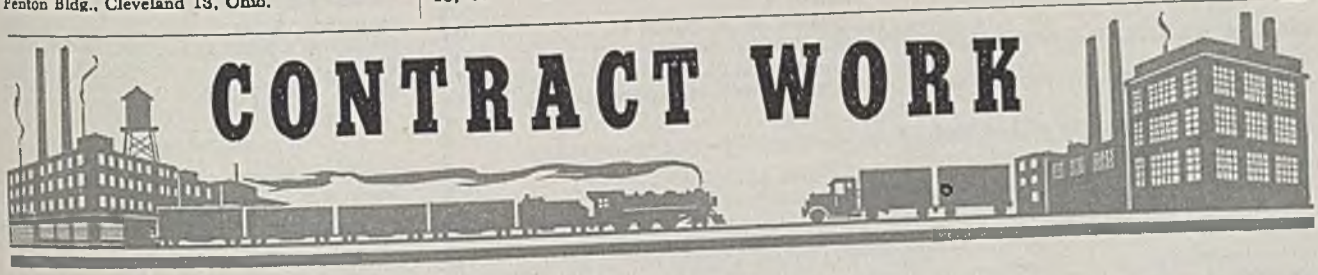

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